THE CONSERVATIONIST

State of New York Conservation Department • February • March 1951

Clayt Seagears

Thousands of people know Clayt Seagears. Oh, yes, hundreds of thousands—many from the days when he was more active than of late on the "banquet circuit." No one who ever heard Clayt talk when he was in real good form, ever forgot him. (We've seen people in a Seagears' audience so entranced they would forget they were holding lighted cigarettes until they burned their fingers.) And many, many more know him through his CONSERVATIONIST feature, "The Inside on the Outdoors Series," concerning which you'll find more on the customary page 48 and the third cover of this issue. Or maybe you knew him for his sketches, drawings, cartoons and, every once and awhile, a darned good oil or water color painting. Or as a huckster, perhaps. A natural-born actor, he loved the show circuit and was "Mr. Conservation" for years at the annual New York Show, the State Fair and the other big ones.

In February this year, Clayt Seagears, Director of this Department's Division of Conservation Education, will retire. Now, if that conjures up visions of an elderly chap slumped down in the old rocking chair, placid hands folded amidships, I've either used the wrong word or your vision reception needs adjustment. Better to say, in Clayt's case, that there will simply be a change of scene. After 24 years at this stand, a new chapter in the Seagears' saga is about to open. We suggest that you keep the "book" handy; we think the new chapters will be worth attention.

So maybe you know Clayt as an entrancing speaker; maybe as the pen stylist who took you with him in his unique "Inside Out" series into the wonderful world of Nature; maybe as the clever cartoonist, or the artist who could capture the warmth of afternoon sun on a weathered barn; maybe as a huckster selling conservation at the State Fair.

Or maybe, like those of us who have worked with Clayt these many years, you know him with all these "hats." And if so, like us, you must marvel, with a wee bit of envy, if the truth be known, that just one man could have so much talent going for him. So much that there's probably no need for us to hope that he will bring it all into focus for the Seagears' chapters ahead. But we do so hope, and we'll add it to the well wishes of the thousands and thousands who know Clayt wearing one or another of his many "hats."—Editor

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State of New York Conservation Department

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February-March, 1961

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People and Land

by Justin W. Leonard, Michigan Department of Conservation, Lansing, Michigan

Last summer, on Long Island, Dr. Justin W. Leonard addressed the 10th Annual Sportsmen's Conservation Workshop, collaboratively sponsored by the Department of Conservation at Cornell University, the New York State Conservation Council, and, in 1960, the Marine District Office, New York State Conservation Department.

Dr. Leonard's theme, and the theme of the Workshop—People and Land—has a special impact for Long Island's pyramiding population; shrinking open lands—but none of us are far behind.

Published here is the full text of that address, appearing earlier in abridged form in Michigan Conservation *(Nov.-Dec., 1955). We doubt if you will find a clearer review of our prehistoric beginning; a more penetrating analysis of our modern day problems—one of which is the intelligent and constructive use of increasing leisure time.*

In this last reference, it's important to note that Dr. Leonard's talk was given before the successful passage of New York's $75 million recreation bond issue.—Editor

THE earth is productive. Its productivity staggers the imagination if one thinks of all the teeming life it has supported since life's creation. Yet its bounty rests on simple things: Land, water and energy from the sun. Five billion years ago, cosmogonists tell us, the earth came into existence, a tiny speck in the awesome stroke of creation which sent our galaxy and its millions of sister galaxies reeling through the incomprehensible reaches of space. For perhaps half this time it was a hot sphere, losing elements of its substance to outer space. But the crust of native rock gradually cooled and solidified, gases given off by the rock clung to the sphere by gravitational attraction and so built up an atmosphere. Water from this atmosphere condensed, fell back to the hot surface as rain, revaporized, recondensed, for such ages as we can only guess.

Yet this tiny speck of matter contained within it all the elements needed to build an amoeba or an elephant, a toadstool or a redwood, a pterodactyl or a man.

For two and a half billion years the earth has supported life. During that time its surface has been flooded by seas, heaved up into mountains, ground flat by glaciers, or worn away by the gentle, persistent action of rain and frost. Through it all life has endured—in infinite variety, but all resting on the simple but wonderful miracle of chlorophyll, the heart of the green plant, which can use the sun's energy and the raw elements contained in land and water to build the carbohydrate molecule.

Why then, you may inquire, if the earth has maintained life through such changes and such spans of time, should the conservationist express concern? For that matter, why should he even exist? The answer lies in man's new attitude toward the earth. And I say new advisedly, for it is only within the memory of most of us that this new attitude has arisen—the thesis that man's highest goal is to alter the face of the earth, and in doing so to ride over her rough-shod, forcing her to his will rather than winning her consent.

Early Man

Anthropologists tell us that man, the most recent and the most dominant form of life to tread the earth, arose as a species between half a million and a million years ago. From the first, if clever attempts to reconstruct prehistory have any validity, he lived in close harmony with his environment. He respected the earth for her unfailing bounty. In pre-Christian times he worshipped her as a fecund and generous goddess, the Earth Mother. In historic but still pagan times he revered her as the Great Mother of the Gods, under as many names as there were racial tongues—Gaea, Rhea, Demeter; Aphrodite, Cybele, Persephone; Isis, Astarte, Ishtar.

The ancients lived in harmony with their environment from necessity. For they had found that the earth was a stern, as well as a generous mother. If her will was flouted, her punishment was prompt and devastating.

Yet, through much of man's history, his demands on the earth's resources were modest in the extreme. They were, in fact, little greater than those of the brute animals, and his numbers were limited by the same elemental factors—famine, pestilence, exposure and competition, the latter refined by man from the individual combat of the brute to the glorious organized warfare of humanity. Loomis has remarked that if we were to liken the half-million years of man's existence to one man's fifty-year lifetime, we could say that his first 49 years were spent as a food-gatherer—as a hunter and fisherman, usually nomadic in habit—and that only last year did he settle down and learn to grow his food by cultivating crops and domesticating wild animals. On the same time-scale the harnessing of steam power and the start of the Industrial Revolution happened only a day or so ago, and the common availability of electrical power and the dawn of the Age of Atomic Power are developments of the moment.

Modern Man

To revert again to the normal time scale, it is only within the last two centuries that man has possessed inanimate power in the supply sufficient to let him think seriously of altering the face of nature, and to let him make significant inroads on the non-renewable resources—ores, minerals, fossil fuels, whose maximum abundance was established when the earth was formed. It is safe to say that man has made a greater dent in these non-renewable resources within the past 50 years than during all the millenia of his earlier existence.

To cite a few statistics in support of this view, competent authority has estimated that when Alexander the Great captured the cities of Susa and Persepolis he seized gold and other precious metals valued (in terms of today's dollars) at $190,000,000, and this was the accumulated wealth of a thousand years. Yet the gold mines of the South African Rand have produced that much gold in a year. Modern blast furnaces would take less than a day to produce the world's total output of iron in 1750.

The key to modern man's new and untried domination over nature is inanimate power; the power we command at the touch of a button or switch. Not only has it enabled man to exploit mineral reserves at a fabulous rate; it has enabled him to feed the rapidly growing populations fostered by industrial civilization. In 1820, the average American

farmer produced enough food to support himself and *four* others. Today he can produce food for 23 others. Writing in the early 1920's the then Secretary of Agriculture, William Jardine, remarked that an Egyptian farmer from the days of the Pharaohs, if transported by magic into a Kansas wheat field of our grandfathers' time, could have fallen to work at once at a familiar task with a familiar tool. Today many a middle-aged city dweller whose childhood was spent on the farm may return to his birthplace only to stare in open-mouthed wonder at the array of power machines, many of which he can't even recognize from experience of thirty years ago.

The Power of Knowledge

Man's mastery of inanimate power, and the culture this mastery has made possible—the development of science and its successful application to matters of medicine, public health, nutrition and the myriad material conveniences of our times, all stems from the most valuable resource of all, knowledge. Knowledge is culture, and it is culture which sets man apart from the other animals. Knowledge and culture have been accumulating ever since man arose as a species, endowed by the Creator with a thinking mind and with the priceless gift of language, by means of which experience and abstract ideas could be transmitted from generation to generation. At several earlier times in his history man has been on the verge of creating Science—the orderly classification of knowledge and the discovery of new facts and principles through objective research. The Greeks of the Classical Period were close to the discovery of the atomic basis of all matter. Their advances in mathematics, built on earlier thought of Egyptian philosophers, served man until the Renaissance.

The Greeks had leisure for creative thought by virtue of a slave economy. At its flower, the Athenian Civilization consisted of only about 50,000 aristocrats, supported by the labor of a much larger population of slaves.

Modern Man, at least Western Man, has in his millions the leisure time only a few thousand Athenians could enjoy, because he has machines as slaves. No longer is his productive capacity determined by the strength of his muscles. His intelligence, guiding the power of the machine, has increased his productive capacity so greatly that his working habits have been revolutionized almost within a generation. Primitive man probably had no easy time of it. Almost certainly the gathering of food occupied most of his waking hours. Down through the ages man has lived by the sweat of his brow. We all know the old saying, "Man must work from sun to sun." Now, almost within our own memories, the working day has dropped to 10 hours, then 8 hours, and the work week from 60 hours to 40, with the 35- or 32-hour week an imminent possibility.

All this spurt in individual productivity, which makes so much leisure possible for so many, stems from man's new-found ability to exploit and process the earth's resources with unheard-of rapacity.

Nor is this necessarily evil. Being men, it is logical for us to conclude that man is Nature's highest achievement, and that the wealth of its resources should be his. In that view, which most of us hold, resources have value only as they are of use to man. The resource that is not used is without value. The nickel-and-iron core of the earth is valueless to us today, for we have not yet learned how to use it. The rich oil fields of Texas had no value to the aborigines of the Southwestern United States, as they lived precarious and squalid lives pursuing the buffalo over the land's surface. As Zimmerman puts it, "The word 'resource' does not refer to a thing or a substance but to a function which a thing or a substance may perform or to an operation in which it may take part; namely, the function or operation of attaining a given end such as satisfying a want."

There are two prominent schools of thought today, so far as our resources picture is concerned. There is the pessimistic school which views with alarm and with Cassandra-like croakings the rapid depletion of fixed reserves; and there is the optimistic school, the "Cornucopians," who cheerfully assure us that man's ingenuity will always keep up with population growth, that Science will constantly find new ways to feed and clothe us.

The optimists are made up chiefly of physical scientists and engineers, and there is much to warrant their optimism in view of new and ingenious technical developments which have served to uncover previously undiscovered sources of oil and minerals and to discover plentiful substitutes for scarce commodities or more efficient and less wasteful ways to utilize familiar resources.

Natural scientists, too, have contributed to the optimistic view by their work in developing new and higher-yielding strains of food crops and animals, better methods for producing, processing and distributing food products and in developing techniques to make the desert fruitful.

My own position lies somewhere between these opposing views. In many ways I can go along with the optimists. Man has the cleverness to solve almost any problem, provided he has the wit to do so and to foresee the consequences as he moves. It is this last angle which makes me suspicious, and brings me closer to the gloomy attitude of the pessimists.

Instinct vs Intelligence

I believe that our mastery of material skills still far exceeds our ability to comprehend the outcome of the exercise of these skills. There is nothing original in this view—many pronouncements have been made to the effect that man, by unlocking the secrets of the atom, has finally encompassed the means for his own destruction; that he has discovered the power of the gods before he has outgrown the instincts of the jungle. This may be true, and if such fears are realized we need take no thought for the future; there will be no future, at least no material future we can foresee, if we are all blown to glory in one spectacular atomic *whoosh.*

But granting that we do not blast ourselves into eternity there are still grounds for suspicion that our cunning exceeds our understanding. And these grounds are most conspicuously displayed in our penchant for specialization —scientific concentration on the attainment of a single objective with little thought for how the means of attainment

may affect other objectives, other interests, or, fundamentally, other resources.

It disturbs me that the Cornucopians, in outlining their reassuring schemes for feeding unlimited population growth from the bounty of the sea or the possible mastery of the secret of photosynthesis, make no mention of what kind of life this food will sustain. I am willing to grant that future generations may be able to keep soul and body together—but the vigor of the body means little if the soul is starved.

So we have an army of highly competent specialists, each making important contributions to our material welfare, but growing further and further removed from reality so far as fields other than their narrow specialty is concerned. Actually, we are all growing up to be specialists—whether we are of the comparatively small group that extends knowledge or develops new gadgets or whether we are of the much larger group that earns its bread by pushing a button on a machine other men have designed. The very sweep of industrialization that gives us the highest material standard of living people have ever known draws us constantly further from an appreciation of and respect for the homely, everyday resources on which our lives still are based.

What chance has the urban-reared child of today to appreciate the things that support him? For him, water comes from a faucet; milk grows in containers on the front steps; to get light, one flips a switch; for food, one simply picks up the telephone, tells a voice on the other end of the wire what is wanted, and presently food arrives, attractively packaged in cellophane. Can he be expected to realize that land still supports us all? That no matter how cunningly we manipulate it, it remains land and subject to laws far older than man?

Every new technological development seems to bring with it some new use for land. But it is imperative that the specialist who develops the new use, and the populace who enjoy it, consider the effect of the new use on other uses equally important.

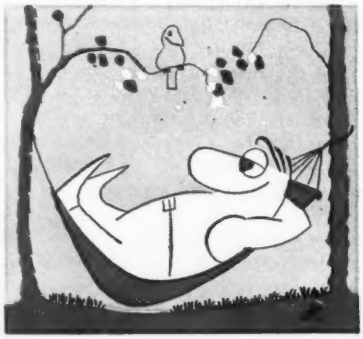
Multiple Use

In this rather involved and circuitous fashion, I have arrived at the idea of multiple land use—a catch phrase currently familiar to many but understood by few. To too many of us, I fear, multiple land use simply means finding room for our pet and particular use and other users better move over.

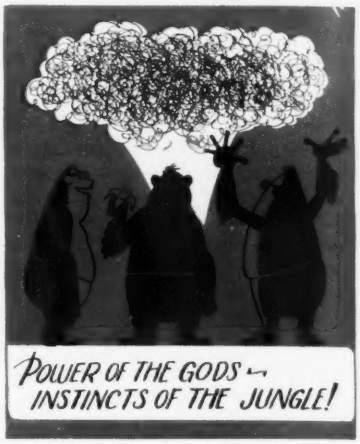
Now, for all the many legitimate uses of land recognized today, the prerequisite to recognition appears to be a dollar sign. But the use I would ask you to consider is hard to qualify in this way. For it is outdoor recreation. It is largely ignored by economists, because its value is as hard to put a price on as mother love. In a sense, it *is* mother love, the love we excercised during "our first 49 years of life" for the earth that sustains us.

Agriculture's claim to land we all recognize. The appreciable areas occupied by our industrial plants are, of course, in good use. The aggregate area given over to highways and railroads and airfields and marshalling yards would surprise us, if we saw it added up, but we would agree it was in good use. So, too, with non-urban housing, a comparatively new development linked up with our rapid means of transportation and our increasingly shorter working day. It is a development lightly industrialized states have yet to meet; but in major centers of population and in highly industrialized areas, it is a use definitely in conflict with other uses, notably agriculture. Recent surveys have shown that between 15 and 25 per cent of the working population credited to our major cities work in town but live in the country, removing land from crop production and posing serious social problems involving schools, roads and other tax-supported facilities. Yet this use of land, too, is undoubtedly good in terms of a healthier, happier, and therefore, better population.

Where, then, if these uses are good, is there cause for critical comment? And what matter if these uses and other financially tangible uses preempt the land and leave nothing for the intangible, non-consuming use of recreation? The question hinges, I believe, on the use to which we may put the new leisure our ingenuity has granted us. Arnold Toynbee, in summarizing his brilliant life work devoted to the history of civilizations, concludes that the greatest problem facing modern man is good use for his leisure time. It is a new problem that has arisen only in our own lifetime. We haven't had time to develop a sure solution.



Perhaps, as populations grow and occupy more land with their gainful activities, people will grow more intellectual and be able to find necessary relaxation by turning inward with their own thoughts—an activity that would require only a square yard of space per individual. That time, however, seems far in the future. Racial memories of "the first 49 years of our life on earth" are hard to still. Most of us seem yet to feel the atavistic pull of woods and waters and on our annual vacations, and as much oftener as we can arrange it, we set out in search of the solitude that grows ever more difficult to find.



Education and the Future

Education seems generally agreed to be the hope of the future. It seems to me that education in the works of nature still is as important in our development as education in the works of man. Nearly 2,500 years ago Plato said, "The works of the Creator must be good because the Creator is good." This statement, I believe, is still true. And education in the works of nature must be conducted in close contact with nature. Therefore, it's our duty to insure availability of land.

We cannot assign dollars and cents value to intangible values, by definition. And yet reservation of land for recreational use will cost us money. It may mean keeping good land out of food production, if non-arable land is not available. It may mean building a highway at greater cost, in order to reserve a less costly route for recreational use. It almost certainly entails preventing industrial plants from releasing destructive pollution into water and air. It may be as easy as authorization of recreational use for municipal water supply reservoirs, now often prevented by archaic laws which modern sanitary engineering has outgrown. It may be as simple as the joint use of forests for both wood production and recreation.

(Continued on page 37)

Cold Storage Trees

by E. J. Eliason, Superintendent of Nurseries

EVERY school child has studied the climatic tempering effects of large bodies of water on adjacent land areas, but it's doubtful if many of us realize these implications in relation to the reforestation problems in the State.

In the Lake Plains region of western New York and in the lower Hudson Valley and Long Island, spring generally bows in a good month to six weeks earlier than in the rest of the State. For that reason, the tree planters in these areas need to get their trees at a date when the seedlings at the Saratoga and Lowville forest tree nurseries are still frozen in their beds. Not only does spring come later to the nurseries' areas than to the more temperate parts of our State, but the trees themselves, growing so densely in the seedling beds, prevent the early spring sun from thawing the soil about their roots, making it difficult or impossible to lift them for shipping.

Moreover, the season for planting trees in New York State is relatively short. They should be planted as soon as the trees are available and the ground is thawed. Freshly-thawed ground is usually moist and thus more favorable for planting. Then, too, the nursery trees at this time have not started to grow and are in the best stage for planting.

A partial solution to the problem was made by shipping planters their trees in the fall of the year so they could be heeled in out of doors over winter. Unfortunately, several factors which make for good storage—temperature, humidity, rodent control—could not be adequately handled in this manner, and it proved more or less unsatisfactory.

Next, in 1951, it was decided that perhaps the Quonset-type igloos that had been used for ammunition storage during World War II might solve the problems. The Department had acquired several of these buildings in central and western New York. These windowless structures were built of concrete and seemed ideally suited to the job. The trees were heeled-in in a foot of moist sand brought in to cover the floor. During the winter, the humidity was controlled by vents, and the temperature never fell to the point where the trees would freeze in the sand. Come spring, the trees were readily available for early shipment. This method of handling was highly successful from the technical standpoint and in a period of five years some 10 million trees were lifted in the fall, tied in bundles of 50 to 100, and trucked to the igloos near Baldwinsville and Lewiston. Economically, however, it was not so good because it necessitated several extra handlings and the labor costs proved to be prohibitive.

Commercial refrigerated storage seemed the next best bet. Here the temperatures and humidity could be controlled accurately and it permitted storage of the trees on racks with a resultant higher capacity per square foot of floor space than was possible in the igloos. Over a two-year period (1956-'57) some 4 million trees were over-wintered satisfactorily in rented structures.

Now that we have proved the feasibility of fall lifting and over-winter storage, it was only a short and logical step to the design of a cold storage plant for this specific purpose right at the nursery site. Soon cold storage plants were under construction at the Saratoga and Lowville nurseries. They were completed in the fall of 1958 and 5 million trees were stored and shipped from them in the early spring. A second plant at each of the nurseries now gives a storage capacity of some 10 million trees. This should be ample to meet the needs of the early spring planters and will solve the problem to everyone's advantage.

The plants, each 36x84 feet, are of concrete block construction lined with four inches of insulation. The temperature is held at 34°F and the humidity at 90 per cent. Trees are stored in tiers of racks in bundles of fifty. The roots are covered with moist spaghnum to keep evaporation to a minimum. Depending on the size of the planting stock in storage, each nursery will hold approximately 5 million seedlings.

Several additional benefits will be derived by having these plants right at the nursery. As the over-wintered stock is shipped, temporary storage will be available for spring-lifted stock. This will be especially helpful for larch which, because it is needle-free during the winter, is one of the first species to bud out and lifted—old Sol shines right through to thaw out the seedbed pronto. Also, larch is one of the first species to bud out and by storing this stock a week or two in the cold storage plant we can extend the planting season for this species. Similarly, we can hold the other species back to extend the shipping season should we get an exceptionally hot spring that would cause the stock to bud out much earlier than usual, thereby increasing the planting risk.

With our current production at an annual rate of 50 million seedlings, the cold storage plants are a tremendous boon in alleviating the annual shipping nightmare.

Duck Banding—Why and Wherefore

by Lee W. DeGraff,
Conservation Biologist

INEVITABLY, when someone finds that I am employed by the State Conservation Department, they ask what I do, specifically. Steeling myself, I answer: "I'm in the duck banding business." Now highly suspicious, the individual probes around in an attempt to find out what else I do besides band ducks—after all, this is a paid job—I *must* work sometime!

This is the impression created by the simple phrase "waterfowl banding"—glamorous, exciting, bizarre. Glamorous? Picture yourself on the soggy mud flats of some lake in a driving rain. You're staring at four duck traps each of which contains ten wet, flapping ducks—and as you crawl into the trap where the pelting rain is exceeded only by the muddy wings beating a tattoo on your face and an excited woody climbs your arm to shove off again with the side of your head as the catapult, keep saying to yourself, "This is glamorous—this is glamorous!" Exciting? You're now on the shores of one of the Finger Lakes in mid-January—Seneca, Cayuga, Canandaigua—it doesn't matter which one. A piercing 15 m.p.h. wind is blowing from the northwest but in the quieter coves where your traps are, the 10° temperature has created a film of ice everywhere, except in your traps where the threshing bodies of 30 cans and redheads have kept the water open, but have also coated the trap wire with a glistening, finger-numbing layer. As you break through the ice and slip into the water whose temperature has already sent tingling sensations to your body (through insulated underwear and insulated waders) and approach the trap with a growing awareness that soon your hands will be aching white lumps, keep saying to yourself, "This is exciting—this is exciting!" Bizarre? Now you're in Albany seated at a desk sometime in March. Your winter banding co-operators have been in full swing since January and the endless pile of field sheets from them, the clattering of the typewriter, the never-ending entries of band numbers in the huge ledgers all compounded by the constant receipt of reports of banded birds shot during the previous hunting season, more records to be kept, mistakes to be corrected—don't look now, buddy, but in this glamorous, exciting, bizarre field, you are a bookkeeper!

I have, of course, used extremes to prove a point. Waterfowl banding *is* interesting and it *is* fun, if one can take the good with the bad, but perhaps more important than anything else, it is useful. Banding has been carried on in New York every year since approximately 1917 but in those years it was primarily by private individuals through personal interest. During this time, Departmental banding was sporadic and involved mostly hand-reared stock, so that, in effect, little effort of a co-ordinated nature was being expended in the determination of information which might prove helpful to hunters and in management of the birds themselves. After all, in those days there was no problem; not many hunters and lots of ducks. Soon, however, questions were raised about waterfowl for which the only answers were guesstimates—where do these birds come from? Where do they go? Which kind is killed most frequently by hunters? Which kinds are most numerous? These and many other questions inspired interested and responsible people to try to find answers. Banding, an already recognized technique, was logically considered one way to get some of the answers. Well, that started the ball rolling, and in 1945, a Federal Aid project was initiated in New York to evaluate all of the existing records.

The information gleaned, while very useful, indicated a woeful lack of data in many directions. Most of the earlier bandings had been done on Long Island and in the Finger Lakes. Hunter recoveries from these bandings showed that these birds were being shot mostly in certain areas of the State and practically nowhere else. Now, it didn't take any expert to realize that something was wrong when everyone well knew that waterfowl were shot to a greater or lesser extent almost everywhere in New York where there's water. So, in 1947, with the aid of aerial survey data to pinpoint waterfowl concentrations, an expanded waterfowl banding program was designed to sample portions of the populations which the earlier bandings had not touched. Thus, the way was paved to arrive at the answers to some of the more general questions. As is often the case, however, the best laid plans are strewn with pitfalls. Many areas thought to be satisfactory for banding purposes were stricken with the black hand of defeat. Excessive human disturbance, lack of personnel and just plain unavailability of waterfowl crossed many potential stations off the list. In general, however, the ensuing years produced bandings and recoveries which came as near to representing a cross-section of the State's waterfowl population as could reasonably be expected.

But now we must pause and take a look—a big look—at the waterfowl picture. Until now we've been talking about ducks and New York State when in reality the picture takes on much greater proportions. Not only were biologists in New York interested in ducks, but so were individuals and organizations from all over the continent. Many were banding with great enthusiasm, but little reward, for the picture from an individual's banding, or a state, is only a small part of the overall situation. So it came to pass that the seeds were sown for the birth of a central funnelling or clearing house for all bird-banding in the nation. Thus developed the bird-banding office of the United States Fish & Wildlife Service in Washington, D.C. Where do the individuals and state organizations who band fit into this picture? Well, first of all,

From now on, a duck with identity

not everyone can band birds. Only qualified individuals (very often these people are members of banding associations) or authorized state personnel are allowed to trap and band migratory birds. These people are given serially numbered bands upon which are inscribed the words "Avise/Write Fish & Wildlife Service, Washington, D.C., U.S.A." This is the first step in co-ordinating all banding—the band has a *single* return address. Secondly, any person banding *must* submit the records of his banding to the Service—this is the second step in the co-ordination of our "big picture." Third, and here's the complex gimmick that makes the hairs on even the most accomplished bookkeeper's head stand on end—when a hunter or interested individual turns in a band to the bird-banding office, this office sends him or her a report on the banding history of this bird at the same time that it sends the individual or organization who banded the bird a summary of the recovery information as reported by the person who turned the band in. In addition, it sends reports of all bands recovered in New York to the organization representing this State, in this case, the Conservation Department, no matter where banded. In this way, interest in banding and reporting the bands is kept at high pitch since the individual is now assured of an answer to his report and the bander receives a complete report on the "returns" of his banded birds. This is especially important to the waterfowl biologist or statistician whose accuracy in solving population problems is wholly dependent on the accuracy of the reports.

Now we have the mechanics of waterfowl banding refined to the point where the information might mean something. "So what?" the interrogation goes. "So now you know where certain species come from, where they go, what routes they take. It hasn't helped the hunter and it hasn't helped the ducks; so far it's only given biologists some numbers to play with and maps to draw." Well, you're right—unless this information can be put to use, it's just about as vital as last week's newspaper, but the map drawing and numbers game has pointed up certain facts. From a State point of view, it's indicated several things. For one, it has given us an idea of *when* these birds are in New York and available to the hunter. Generally speaking, the area of banding will produce the most recoveries. If at the end of the hunting season we find that the number of banded New York birds reported shot in New York is only 3 per cent of the total shot, while in several other states it averages 5 or 6 percent, then there's something wrong—New York's hunters didn't get a fair share of the harvest. If in addition to this, we find that all of those that were taken in New York were taken the first week of the season, then we'd be highly suspicious that the season opened too late. Of course, it isn't all that simple: of the eight or nine major duck species taken by hunters in New York, each varies to some degree in the time at which they arrive and the length of time they stay. Even this varies within the same species from year to year. So it isn't a simple question of let's open the season—here they come. It's rather let's open the season now because the ones that have left are in lesser numbers than the ones that are here, the local breeders are probably well diluted by migrants, and if the weather holds—whoops, well, how do *you* forecast a quick freeze?! So you see, the best anyone can do is take an average of an accumulation of records and work from there. This is one of the reasons that banding stations must be operated over a comparatively long period of time. The unthinking critic often has much to say about doing what appears to be the same thing over and over and getting similar results again and again. Well, if the results were always the same, it wouldn't have to be done over and over. Unfortunately, waterfowl and other game species often do not co-operate in providing the easy systematic data that man would like to impose upon them.

What else is banding data good for? Now that we know something about the trips these birds take, we see also that certain hunter band returns quite consistently follow certain patterns or flight "lanes," indicating that these birds are apparently divided into different populations. Each of these populations may differ in the time at which the greatest numbers arrive in New York. Band returns cannot always indicate this, for example a flight "peak" may have passed by the time the season opened (this is where aerial surveys are invaluable in determining times of "peak" concentrations), but the time at which the greatest number of banded birds are shot is certainly an indicator. It was partly through banding return data that it was determined that Long Island harbored an entirely different population from the rest of the State and therefore merited a separate season.

A matter of similar circumstance in which banding has played an important role in New York is that concerning the diving duck hunting opportunity afforded in the Finger Lakes and Niagara River areas. Large concentrations of diving ducks, mainly canvasback, redhead and scaup, winter on these areas every year. Aerial surveys had indicated that the arrival of these birds to their wintering grounds in New York coincided fairly well with the dates of the hunting season. Hunters in these areas, however, felt strongly that they were not receiving the optimum share of the harvest of these birds and in 1955 a large scale banding operation was started by the Department, aided by several sportsmen's groups. Five years' band return data has accrued and generally, has showed this to be true—most seasons close too early for these hunters. Band returns, again evaluated from the point of view of when the birds were taken in New York, indicated, for the most part, that hunter success was just approaching its upward climb near the end or at the close of the season, even though the birds were there much earlier! This, then, was not a case of waterfowl presence, but availability—another cog in an already complex arrangement of gears.

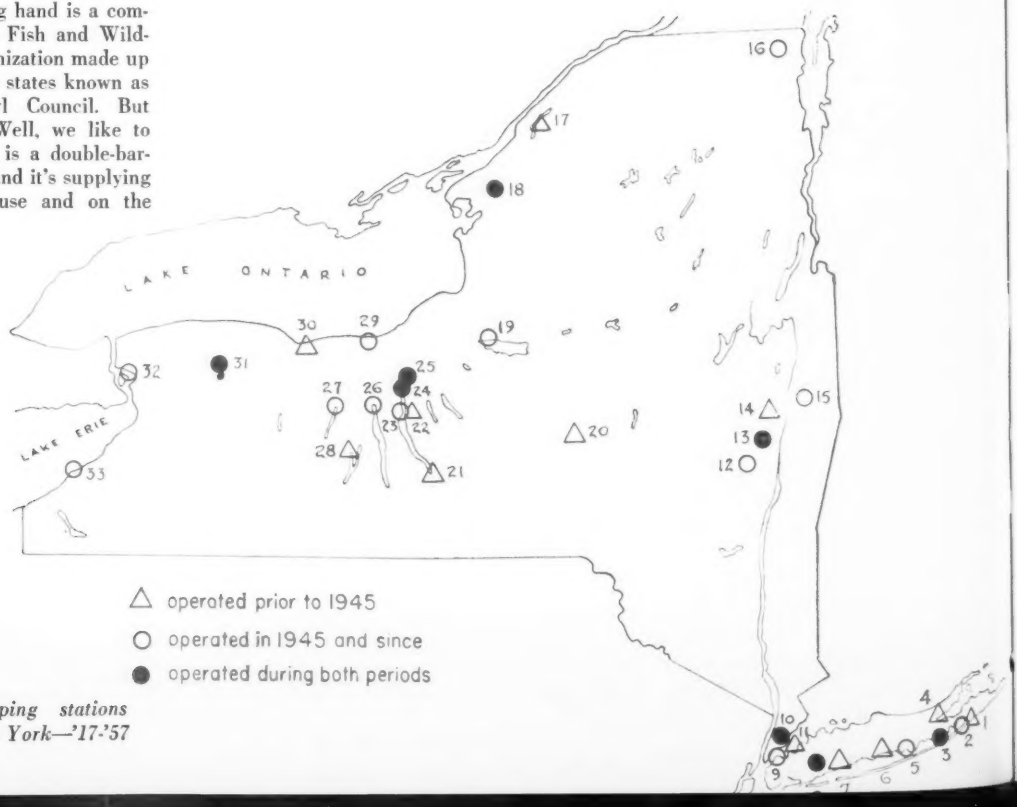
So it has been and probably will continue to be—banding in an attempt to answer some questions, has created new problems to be solved; some by more banding of a continuing or specialized nature, some by other means. But we feel that it is the right direction; the answer is not to wallow on in ignorance, but to be aware of the hurdles that must be jumped and hope that the jump will be strong enough to land us on the other side.

The scope of banding and the information from it extends in other directions, although the preceding is probably the major areas of interest from a statewide point of view. The part banding plays in the waterfowl management of our several game management areas is more local in nature, but nonetheless important to the district game manager. He must have answers concerning the opening of seasons on his area and answers to the public concerned with waterfowl. In these re-

spects, banding information serves him in good stead, for it supplies him with species kill information, the amount of harvest on his area vs. birds taken outside the area and other information which helps him to determine the effect of seasons on kill.

We have talked about the State point of view, but again we must go back to our "big picture" to get a complete look at waterfowl banding. The "where they go, where they come from" angle is still incomplete, since most of the discussion until now has been "when" rather than "where." The "where" part is the flyway angle and the manner in which New York fits in. We can never claim ownership of any duck even though a certain proportion of them start out as eggs right here in New York. Were any state or country able to claim ownership on the basis of production, Canada would be far and away the leader for the Maritimes, Quebec, Ontario, Manitoba and Saskatchewan—supply the lion's share of the birds we harvest. By the same token, these birds must have a place to stay over the long winter; the prime claimants of ownership would then become states to the south of us, Maryland and the Carolinas being the major ones. So of the million-odd waterfowl that winter in the Atlantic Flyway, New York may have 15 per cent—quite a few birds, sure, but not enough to make us chairman of the board. So it is that we all have a part in the welfare of the ducks and logically there should be a guiding hand representing all parties concerned with this welfare. The guiding hand is a combination deal; the U.S. Fish and Wildlife Service and an organization made up of representatives of the states known as the Atlantic Waterfowl Council. But what about banding? Well, we like to think that our banding is a double-barreled activity. On one hand it's supplying information for State use and on the

Area over which waterfowl banded in New York have been retaken, showing relative frequency of such recoveries



Waterfowl trapping stations operated in New York—'17-'57

other hand, it is contributing its part to the knowledge of waterfowl in the Atlantic Flyway. We talked earlier of the Fish and Wildlife Service as a central funnelling house for all banding. Data pours in from all states in the Flyway creating a fund of knowledge, both accumulative and annual, upon which the Service depends at least partly, for each year's determination of waterfowl status and consequent season setting. It provides, in addition, information for population studies which will let us know more about the individual species we are dealing with, for they *are* all individuals A duck is not a duck in the specific sense; a duck is a canvasback, or a black, or a woody, each with its own individuality and habits peculiar to its species. Therefore, they should be treated as such. I say should, because as yet there is not sufficient data to intelligently go at species management in all cases. What makes sufficient data? Sufficient data as applied to waterfowl management is information specific enough and cumulative enough to establish valid reasonable norms of what has happened concerning production, mortality and location of breeding, migration, wintering and harvest areas, in order to determine with a fair degree of accuracy what will happen under a given set of conditions (hunting season, in this case) in the future.

This is a big bite, an ideal if you like, but it is towards these ends that waterfowl research works. Today within the Atlantic Waterfowl Council there exists special groups within a technical section concerned with the various problems of waterfowl research and management. One such group is the Banding Program Committee, set up to determine the part banding or the use of banding data may play in helping to solve waterfowl management problems, and the most efficient method of obtaining such data. It is this committee's responsibility to make recommendations to the Parent Council regarding the kinds, amount and location of banding to be carried out in the Flyway. Obviously, this involves the support of and participation by all states in the Flyway. It is only in such a co-ordinated manner that the "big picture" of waterfowl can be obtained.

This then produces the information concerning the "where they come from, where they go" aspect. But knowing where they come from is not enough; we must know also the characteristics of the various breeding and wintering populations, the extent to which these populations are harvested and where they are harvested, in order to get some idea of the annual status of the birds about to undergo a hunting season. As much as

Duck hunters can assure maximum benefits by reporting band numbers

we would like to, we can't follow these birds to do this, personally, so we have to band them and depend on hunters and other interested individuals to report the bands. They also have to be banded in a manner which will represent the total population, not just one group. Of course, another thing that makes it so difficult and why large-scale banding is necessary is the ratio of reports received in relation to the number of birds banded. For every 1,000 birds banded during summer and early fall, we can expect 100 returns; for the same number banded in winter, 70 returns. The reason for the difference is the lapse of time between banding and hunting. The less elapsed time, the more banded birds available for the gun, since they haven't had as much opportunity to suffer mortality from other factors. In general, whether it be summer or winter, the reward is small for the effort put out.

Well, we've been preaching united effort, more information, more banding, all so we can know more about waterfowl. How come? We've been hunting ducks for years and years; they're still around and they were around without all this "management." There're also lots of hunters around, more in recent years than ever before, but the duck population hasn't gone up with the people population. In fact, each year many, many acres of either breeding or wintering grounds are lost faster than governments and dedicated organizations can preserve or develop them. As a result, all the tools available to biologists must be used in order to keep what we have producing at maximum and at the same time, allow every one who wants the enjoyment of waterfowl hunting, to keep the favorite shotgun from collecting rust. None of us here are working against the hunter as some people feel; we like our days in the marshes as well as the next guy, maybe more, and if the time ever comes when I no longer have to snitch from the house money for license and stamp or buy a box of shells for my wife's birthday, I'll be as sorry as you; even sorrier, for somewhere along the line I'd figure that I had missed a bet in my own small attempts to keep *our* hunting going.

Wood on the Ball

From Little League to Major League, the big baseball swing is with ash. Northern white ash is the tree which provides the wood for over 95 per cent of the 6,000,000 bats used each year by ballplayers around the world. In all, more than 200 varieties of bats are turned out—in all weights, sizes, lengths and shapes. Ash is considered the best quality wood because it is ideal for powering long drives. The wood is close-grained, elastic and combines light weight with hardness. It allows for snap action to sting the ball and send it.

Is there any danger of the supply of this valuable forest tree running out? The answer is no, as long as tree farm principles of good forest management are followed on company-owned lands and by small wood lot owners. Any of the tiny ash seedlings in the forest today may turn out to be the deciding factor in the 2000th World Series. Who knows?

Ash gets its name from its dark brown, ashy-grey bark. Much of the best ash is found in southern New York and northern Pennsylvania. But ash grows in all states east of the Mississippi. The best bat wood, experts say, comes from 40- to 60-year-old ash trees growing in moist, well-drained soil and under uniform climate conditions.

Appropriately, the historic shrine of baseball, the National Baseball Hall of Fame and Museum at Cooperstown, is located near the heart of the best bat-producing forest area in the world. Housed there along with other baseball memorabilia are bats wielded by the top stickmen, who, in their day, have provided some of its most thrilling moments.

Reducing a full-sized ash tree to bats is an intricate process. Foresters employed by leading bat companies select only the mature tree (12 to 15 inches in diameter) for harvesting through selective cutting under predetermined forest management plans. It's estimated that about 60 billets (from which bats are made) can be made from each tree.

First step in making a bat is cutting the ash log into 42-inch lengths. These are then split by hand into pie-shaped wedges (splits) from which they are formed into billets on mill machines. After 18 months of aging, the billets then go into fabricating plants where lathes trim and curve them into bat size and shape. Quality control is pursued diligently to determine exact weight, size and balance. In the final stage the bats are dipped into a compound to give added protection to the grain. They finally emerge with manufacturer's imprint and in many cases with the name of a particular player.

The Speculator Tree Farm

A Major Adirondack Landowner becomes a Co

by Robert G. Zilliox, Regional Supervisor for Fish and Game, N. Y. S. Conservation Department

IN September of 1959, the State Fish and Wildlife Management Board invited representatives of private and corporate owners of large timber lands to a meeting in Ray Brook. The objective was to discuss mutual problems and determine how and where the provisions of the State's new Fish and Wildlife Management Act could contribute to their solution and, at the same time, add to the opportunity for public hunting and fishing. This preview was followed by several meetings between the International Paper Company and the Department during the spring and summer of 1960. Specific problems were discussed and provisions for a co-operative agreement worked out.

Now, to shed a little light on the type of operation involved, a tree farm can be considered any privately-owned, tax-paying forest area, larger than five acres, scientifically managed and dedicated to the growing and harvesting of tree crops. Certain standards and procedures are required before a tract can be certified by the New York State Tree Farm Committee. Contrary to popular belief, certification as a tree farm does not entitle the landowner to any tax abatement "gimmick."

Nor is the Speculator Tree Farm a level piece of ground with waist high trees over which deer heads are readily discernible. Rather, as the accompanying photographs show, this 29,400 acres of International Paper Company's land, located in Hamilton County near Speculator, is typical Adirondack big woods country.

Most of International Paper Company lands in New York (including their Speculator Tree Farm) are open to the general public—and have been for more than 60 years. However, increasing hunting pressure and unsolved wildlife-forestry management problems set the stage for negotiations under F.W.M.A. International was interested in the orderly harvest of fish and game, the effects of big game populations on timber resources and the Department was interested in the possible solution of these problems so as to *keep* these lands open to public recreation. The resultant co-operative agreement included the following management procedures:

(1) Deer browse damage information. Deer browse surveys are presently in progress in this area by company personnel. The Department will provide advisory assistance in these surveys and aid in the analysis of survey data.

Flanked by International Paper's Eastment, left, and Pesez, right, Conservation Department's Preston, Chase, Robert and Zilliox join to inspect new entrance sign

(2) Hunter distribution and deer harvest information. The Department conducted four deer check stations per week end for the first three week ends of the big game season. The record showed that approximately 5,000 man-days were spent hunting in the interior portion of the area and it is apparent a comparable amount of time was spent hunting the lands bordering Routes 8 and 30. Forty-two deer and three bear were checked through the deer stations, with an estimate of about 100 deer coming from the tract. Most of the deer taken were shot less than two miles from where the hunters' cars were parked. Check station data showed that 31 per cent of the hunters stayed at hotels, motels or leased camps; 39 per cent traveled to and from home; 5 per cent stayed at Department campsites; 9 per cent camped on State land or in trailers; 2 per cent slept in cars, and 14 per cent were not classified. Approximately 11 per cent of the hunters had party permits involving a possible 42 per cent of the hunters in party permit hunting. Many hunters came from the Albany-Schenectady area. Southern New York and Long Island were also represented. Five per cent of the total were out-of-state hunters.

(3) Safety precautions for active logging operations. The Department provided safety zone posters which the landowner put up in areas where active logging operations were in progress.

(4) Parking areas. The landowner provided strategically located parking areas and permitted the use by the public of its logging roads.

(5) Mile markers. The landowner provided mile markers on the interior road network as a guide to the hunter.

(6) Protective patrol. The Department provided full time protective patrol and also aided in controlling camping, fires and educating the public in use of the area. No hunting accidents, few Conservation Law violations and good co-operation from hunters highlighted the big game season.

(7) Education towards proper land use. The landowner provided a detailed

a Co-operator Under the Fish and Wildlife Management Act

One of the hunter parking lots provided by International on their Speculator tract

Two of the lucky hunters bring a nice buck into one of the Department's check stations on International tract

brochure and sportsmen's map of the area showing nearby Lewey Lake and Moffet Beach campsites, operated by the Bureau of Camps and Trails to provide camping facilities for tree farm and other hunters.

(8) Identification of nearby State lands. The Division of Lands and Forests erected signs denoting State lands adjacent to the co-operator area.

(9) Fisheries. Although the co-operative agreement received its inaugural during the hunting season, plans are in progress for lake, pond and stream surveys of area waters during 1961. Some of the waters on the tree farm area are now being stocked by the Department; however, up to date management plans for all waters are needed.

Due to the road network and mile markers in the area, there were few lost hunters. However, midway through the big game season one hunter became separated from his companions and spent the night in the woods. Game Protectors, Rangers and volunteers searched until 2 A.M., firing many shots in an attempt to guide him out to a road. Finding his way out the next morning, the errant nimrod's opening remarks to Special Game Protector Robert were: "I don't know if you guys know it or not, but there is a heck of a lot of night shooting going on in this country."

Some hunters were undoubtedly disappointed about the deer not being as numerous as the hunters on the area. The excellent sportsmen's map prepared and distributed by International Paper for the Speculator Tree Farm and the resultant publicity unintentionally contributed to the idea that the place was over run with deer. At any rate, Ranger Page stopped to talk to a hunter who was reclining against a tree, sipping hot coffee and munching on a sandwich along the East road. After listening to the hunter's pleasantries concerning a dearth of deer in the area, Page pointed up the road about 100 feet and casually asked the hunter what was in the road. Feverish activity on the part of the once reclining hunter failed to affect the health and mobility of an eight-point buck crossing the road.

The development and execution of the plans called for in the Tree Farm Agreement was an excellent example of co-operation between various Departmental units. Frank Moore, Chairman, District Board 10, likened the co-operation to the play of a well drilled football team.

The significance of this agreement between the Department and International Paper is the concept and vision it embodies for the future of public uses of private lands in the Adirondack region. Here is a design for large Adirondack landowners beset with problems related to continued recreational use of private lands by the public. It should serve as a blueprint for other large landowners whose acres are presently closed to the general public. With the big game season ended in the Adirondacks, International Paper and Department personnel concur that the aims and objectives of the co-operative agreement have had a successful launching. Proper behavior, sportsmanlike conduct, respect for signs, buildings and equipment and observance of laws, rules and regulations will, in the last analysis, decide the fate of this and most other landowner agreements.

Wetlands Preservation On Long Island

by John E. Harney, Wildlife Biologist,
Branch of River Basin Studies, U. S. Fish and Wildlife Service

RECORDED history is replete with many versions of the expression, "If only we had realized what was happening, maybe we could have done something about it." It often happens that nothing *can* be done about it when the point of no return is reached. Belatedly, we find we've missed the boat in protecting one of our most valuable resources—the wetlands of our nation! Fortunately, we can still do something to preserve a *part* of what is left.

Long Island—some 1,400 square miles of the Empire State lying just to the east of Manhattan's skyscrapers—is blessed with thousands of acres of tidal marsh and, of course, lesser quantities of freshwater marsh along its streams. Thousands of acres already have been destroyed or so altered that their value for fish and wildlife has been greatly decreased—and a good share of this has happened just since the end of World War II. There remain, however, extensive wetlands, their associated mudflats and shallow bay waters. Preservation of this valuable resource, important as a source of food, for recreation, for scientific study—in fact, as a vital segment of the local and national economy—becomes increasingly important with each passing day. True, we're late, but perhaps not too late to salvage a part of the God-given resources which, once destroyed, can never be replaced!

Wetlands—areas covered with shallow water, either permanently or long enough to support moist-soil vegetation—include salt marshes, mudflats, bogs, wooded swamps, marshes, wet-meadows and flood plains. They are not wastelands! Tidal marshland produces about 10 tons of vegetation per acre. In comparison, an inland acre of cropland produces an average of 10 tons of sugar beets per acre ($11.30 per ton) and hay about 1½ tons per acre ($21.50 per ton). At the turn of the century, the seaside farmer often valued his tidal marshlands higher than his upland fields because of the huge quantities of saltmarsh hay produced per acre.

Tidal marshes play an important role in the accumulation and release of nutrient materials into waters of our bays, sounds and river estuaries—nutrients which are the beginning of the food chain for waterfowl, finfish, shellfish, and ultimately, for humans. Precipitation and the rise and fall of tide waters wash these basic nutrients into the waters to maintain the high fertility so important for all marine life, from the microscopic forms to the bigger fish, shellfish and waterfowl. Studies in Georgia showed that over 500 pounds of sugar are produced per acre per year on tidal marshes of that state and each 50 gallons of water which flushes the marshes accumulates and released about 18 pounds of phosphates for the replenishment of plant life.

These inshore, brackish water environments of our estuarine areas are responsible for the presence of an extremely valuable resource for commercial and recreational uses. The delicate balance of salinity, temperature, currents, turbidity and other factors, provides just the right conditions for either spawning, nursery or production areas for the bluefish, common eel, flounder, fluke, menhaden, weakfish, hard and soft clams, oysters, scallops, shrimp and bait fishes. The value of the annual harvest of shellfish on Long Island averages about $5,500,000, and the finfish harvest averages between $3,350,000 and $3,500,000 a year. And this does not even take into account the many related businesses sustained by the commercial fishing industry and the recreational fishery.

Wetlands and their associated mudflats and shallow bay waters are important, too, for the vast waterfowl and shorebird populations which use them. Long Island is important as a wintering area for waterfowl raised in Newfoundland and the maritime provinces of Canada and in other areas. Nearly 180,000 wintering waterfowl have been counted in aerial surveys of Long Island—in a single counting! Countless thousands of birds stop on Long Island's bays and marshes to rest and feed in their spring and fall migrations. They provide a great deal of recreation for waterfowl gunners, bird watchers and nature study students. Numerous businesses are sustained by the sale of sporting arms, ammunition, equipment, food and lodging, marine equipment and fuel.

Wetlands, in their natural state, have other important uses, too! They provide a "buffer" for shoreline properties, dissipating the battering force of ocean-born storms and allowing storm tides to rise with minimum damage to property. They provide outdoor classrooms for high school and university classes in the biological sciences. They provide a place for thousands of bird watchers to observe waterfowl and shorebirds. "Dedication" of these wetlands and underwater lands to fish and wildlife and their enjoyment may be the most important use to which they can be put.

Unfortunately, the needs of man brought on by the relatively recent population explosion, the changing work-leisure pattern and rapid technological advances, have stimulated the exploitation of wetlands for other purposes. Nearly three-fourths of our people live along the coastlines of our nation. Metropolitan New York and Long Island have nearly two-thirds of the State's population of some 15,000,000 people. Our greatest industries are developed along our coastlines and our waterways. Urban development goes hand in hand with industrial development, and where people live they must have facilities for recreation, transportation, communication and commerce. In the development of these facilities much of the wetlands have been destroyed or seriously altered; this means a loss of habitat and a reduction of fish and wildlife.

It is paradoxical that while wetland areas are being drained or filled to provide more facilities for the use of bay waters and marshlands, the very acts of draining and filling are destroying natural habitat that produces the fish, shellfish and waterfowl which people seek. It is inevitable that marshes will continue to be destroyed in the normal

development of our coastal communities. Wildlife administrators recognize that fact. Wildlife people stress however, that we must plan for the orderly development of our shorelines and insure the preservation of natural areas. Otherwise we will have lost in a matter of decades what Nature has taken centuries to create.

Why and how are tidal marshes being destroyed? The "why" might be answered simply by saying that these flat areas, monotonous-looking to some people, are considered by the majority to have no economic values unless filled for some type of "development." Few people realize just how valuable they are to our economy. More specifically, however, wetlands are being destroyed to control mosquitoes, to reclaim the land for agriculture, to provide sites for housing and industry, to enlarge recreational facilities, to provide for navigation improvements, to provide transportation and communication facilities, to remove minerals (sand and gravel) for sale and to provide fill for erosion control and hurricane protection for the beaches.

Any of these activities, singly or in combination, change or eliminate the natural environment. In addition, we dump pollutants into the waters, hasten sedimentation, restrict or alter currents and add residual insecticides. These, too, change the environment for fish and wildlife. Since there is a direct relationship between the amount of food and cover available (products of the environment) and the numbers of fishes and wildlife, per unit of area, a decrease in the amount of suitable environment will result in a decrease in fish and wildlife numbers. *We, the people,* are the losers in the long run!

Once salt-water shallows, now a desert; soon a crowded suburban community

In 1955, a nation-wide survey of wetlands was made jointly by the U. S. Fish and Wildlife Service and the state fish and game departments. This was followed by a 1956 survey of vulnerability to destruction by the various alternative uses listed above. It was evident from these surveys that within a very few decades, we would have practically none of our wetlands left in the heavily-populated Northeast. In fact, the rate of destruction showed definite signs of accelerating under the changing pattern of more leisure time and increasing interest in water-oriented recreation. Long Island wetlands, particularly, appeared to be seriously threatened by the desire for waterfront housing, by the demand for expanded waterfront recreational areas, by the necessity for navigation improvements and by the continued application of accepted mosquito-control methods.

The 1955 survey showed that there were 37,450 acres of wetlands of high and moderate value to waterfowl on Long Island and in Bronx and Richmond counties. Another check of the same marshes in the spring of 1959 showed that 4,692 acres (12.5 per cent) had been lost in the brief period of about five years. During this same period some 1,152 acres (16.3 per cent) of the wetlands having low waterfowl value were destroyed, bringing the total loss of wetlands to 5,844 acres. This loss is 2½ times greater than the losses in the remainder of the State during the 1954-1955 period! It's easy to see that at this accelerated rate nearly all of Long Island's wetlands would be destroyed in a comparatively short time.

Nearly 35 per cent of the high and moderate value wetlands destruction was due to the filling of marshes for housing. Disposal of miscellaneous fill, largely spoil materials resulting from navigation dredging, accounted for about 24 per cent of the destruction. About 16 per cent was lost in the construction or expansion of recreational facilities. The remaining 25 per cent of the 4,692 acres destroyed became industrial sites, marinas, refuse dumps, airports, roads and parking lots. Moreover, with very few exceptions, the wetlands that remain have been ditched for mosquito control purposes, so that their value for fish and wildlife has greatly decreased.

The Long Island wetlands preservation program got its start primarily because of migratory waterfowl. Through international agreements with Canada and Mexico we are committed along with those nations to perpetuation of the continental migratory bird resources. It has been estimated that there should be not less than 12,000,000 acres of land in public ownership to meet the minimum requirements of migratory waterfowl. Of this amount, it is proposed that 7,000,000 acres be acquired by the federal government, leaving 5,000,000 acres to be acquired by state or other public agencies. This is a tremendous undertaking and we are still far from the goal.

The opportunities for acquisition in critical areas, moreover, are rapidly disappearing. Long Island, generally considered to be the most important single unit for waterfowl in the Northeast, is of major significance in the Atlantic Flyway (one of the four administrative flyways

Pumping spoil from bay to future door yards—from wildlife to human habitat

of the country). It is especially important to the local citizens, for waterfowl gunning, bird watching and nature study. "Dedication" to wildlife purposes of land already in public ownership would provide the means for preservation *now* before other uses destroy the habitat forever.

Early in 1957 officials of the New York State Conservation Department and the U. S. Fish and Wildlife Service formed the Co-operative State-Federal Planning Committee for the Preservation of Long Island Wetlands as the first step in mapping out a program to save some of the marshes. Stated briefly, the immediate objective of this committee was: "To assure the perpetuation of the remaining off-shore coastal marshes of the south shore of Long Island extending from the Meadowbrook State Parkway to the Captree State Parkway. . . . Primary attention to be focused upon the 15,000-acre wetland unit extending from Meadowbrook State Parkway to the Nassau-Suffolk County Line." The attention of the committee was focused here because these wetlands represent some of the better waterfowl habitat and because it appeared these would be the first to go.

In September of 1957 a representative of the U. S. Fish and Wildlife Service was assigned to Long Island, "to investigate the possibilities of wetlands preservation—and to assist, in whatever way possible, State and local interests in their efforts to preserve wetlands and marshes." A survey of land ownership, done previously, showed that Hempstead and Oyster Bay townships own the major share of the wetlands in the area singled out by the planning committee. The first move, then, was to arrange a meeting of the officials of both towns, with the committee, and describe in detail the value of the publicly-owned wetlands in their natural state for recreational and commercial uses and ask for some form of "dedication for fish and wildlife purposes" for the benefit of the public. This joint State and Federal program has been termed "a pioneering effort" as it doesn't attempt to get more State or Federal wildlife land, but rather to get the local towns or counties to set aside lands already in public ownership for the welfare of their people.

It was decided that the committee should recommend a plan for improving and utilizing the fish and wildlife values of the wetlands and shallow bay waters. The recommendations would provide a basis for the orderly management of the estuarine areas, to assure that people would be able to continue using the resources for recreation and as a source of food.

The recommendations were developed after a field survey of the resources and of the human utilization of the estuarine area. Emphasis was placed on the need to save marshes to provide recreational and commercial fishing and shellfishing and for waterfowling and bird watching. Consideration was given to the present and planned public recreational developments in an effort to provide maximum all-season use of the estuarine areas. It's highly impractical to build marinas for anglers and waterfowlers on reclaimed marshland if the destroyed marshes can no longer support fish or waterfowl.

The 500-acre Tobay Pond area, Town of Oyster Bay—first to be developed under the Long Island Wetlands Law

During the course of the field survey, sportsmen's clubs, conservation groups and individuals on the Island began to express interest in the preservation program. Considerable support was given to the effort by the press. The biggest boost of all, however, was the passage of the Long Island Wetlands Bill on April 20, 1959. This law provides the legal basis for the State to give financial assistance to Long Island towns and counties for the preservation and development of wetlands; a practical necessity, since so much of the marshland is under town or county control. In signing the bill Governor Rockefeller said: "It constitutes a definite step toward preserving one of the State's most important natural assets. Unless steps are taken toward preserving what is left of the wetlands, they are in danger of being destroyed by the increasing eastward press of population on the Island."

The first practical application of the Wetlands Law was the co-operative agreement between the Town of Oyster Bay and the Conservation Department to develop the 500-acre wetland tract known as the Tobay Pond Bird Sanctuary (also known as Salt Pond, Guggenheim Pond). The plan calls for intensive improvement of the town-owned "showcase" sanctuary to include building a water-control structure for Tobay Pond, building additional shallow ponds, controlling noxious weeds, adding man-made waterfowl nesting hummocks, erecting a 25-foot observation tower, providing a year 'round access road and parking facilities and erecting boundary fencing. Construction costs are to be borne by the State and subsequent maintenance costs will be divided equally between the town and the State. Base lines and levels already have been run.

It is important to emphasize that recommendations for the multiple-use development of south shore wetlands do not call for huge refuge, or sanctuary, areas. On the contrary, the aim is to protect the wetlands and shallow bay waters from despoilation and also to insure that the public can use these resources. The Tobay area already was a town sanctuary; its development will permit greater usage by waterfowl and shorebirds. This is demonstrated by the three major publicly-owned refuges on the Island—the City of New York's Jamaica Bay Wildlife Refuge, the State's Quogue Waterfowl Sanctuary and the Elizabeth A. Morton National Wildlife Refuge at Jessup's Neck, Noyack. Usage by waterfowl and shorebirds has increased greatly with the application of modern management techniques.

Adoption of a well-integrated plan for use of tidal wetlands would set a precedent unknown on such a large scale. Long-range planning would win the sincere appreciation of the growing population of citizens who look to the water areas for their recreation and businesses. The local towns are in a position to provide that wildlife habitat on town-owned lands; the State and Federal wildlife agencies are in a position to provide specific management plans. The public can help town officials to recognize the need for co-ordinated planning by letting them know of the intense interest in wise use of our renewable resources—renewable, however, only if suitable habitat is maintained. Let us, for once, avoid the need to say: "If only we had realized what was happening, maybe we could have done something about it."

Lake Erie Ice Fishing

by Donald J. Spittler,
Conservation Biologist

ON our smaller inland lakes of the Northeast, ice fishermen generally operate from huts or shanties that mushroom into little villages soon after freeze-up. Proximity to shore, relatively smooth, stable ice, restricted areas and relative ease of travel, encourage all sorts of impedimenta devised for comfort. Ingenuity and experience refine the structures and, in many shanties, conditions approach the average living room for snugness and comfort. Hazards are few and many ardent ice fishing fanatics remain in their huts even after darkness with little concern for wind, snow, direction to shore or safety in general.

But now let's look at ice fishing on the Great Lakes and, on eastern Lake Erie, in particular. This is a different story. In this large body of water, freeze-up is a gradual process, constantly interrupted by strong winds and turbulent water. Normally by mid-December, slush begins to accumulate in the water and wave action carries it toward shore, where it piles up and creates mountains of ice, sometimes thirty feet high. This is the first stage of the freeze-up and the first barrier the ice fishermen will subsequently have to cross. As the slush accumulations extend outward from this barrier, the water gets "heavier and heavier" and acts as a deterrent to wave action. The rolling of the slush over the crest of the waves creates globules and saucers of ice that grow in size as the temperature falls. Usually by early January, a zero blast arrives that freezes the slush-laden surface from shore to shore (12 to 14 miles in this area of the lake), cementing these conglomerations with patches of clear blue ice. But this pattern is rarely fixed; strong winds usually follow that toss and pile the thin ice into "shoves" that may extend for miles up and down the lake. These vary in height and width depending upon the force and duration of the wind; some may be only a few feet high and a couple of rods across, but others may reach thirty feet in height and a thousand or more feet in width. Since these "shoves" occur in the weaker areas, old timers at the game usually await their appearance before venturing far from shore. Each year, however, many unsuspecting neophytes, prodded by impatience, prematurely trek beyond the limits of reasonable safety, unaware of the dangers and hazards. Most are lucky and return without ever knowing the risks they have run. But not all; every winter some are caught in ill winds and know the panic of open water far from shore, or the even greater terror of being caught in a crushing, smashing "shove."

The great expanse, the obstacles, the hazards and the unpredictable habits of the fish have caused Lake Erie fishermen to be nomadic and to travel with only the bare essentials. They wander long distances from shore, over treacherous and jagged ice fields that frequently shift with changing winds and partition loosely-knit floes with broad expanses of open water. Hardly a fishing season passes without mishap, and occasionally a break-up is so extensive that the Coast Guard must be summoned to rescue marooned fishermen from their icy rafts.

Initially, rough, jagged ice may make travel impossible even on foot, but bold pioneers soon break foot trails that eventually become traversable with sleds and jalopies. Intermittent freezing and thawing levels the surface and gradually improves travel conditions. By mid-February the going is usually good and safety is reasonably assured.

Those who travel on foot usually "chop in" before they reach the three-mile marks, but a few rugged souls may hike out five miles or more, and as jalopies come into the picture, fifteen-mile trips become common. In yesteryear, before the advent of the automobile, these long treks were made with sled dogs.

The ice fishing shanty of the inland lake would be an impossible burden under these conditions and the Lake Erie boys have substituted the "windbreak." This is simply a large sheet of cloth (some use plastic these days) stretched around sapling poles that are set in the ice. It is usually erected convexly toward the wind, and does a reasonable job of providing comfort, but to a much lesser degree than that enjoyed by the shanty dwellers. The great advantage, of course, is that the entire setup can be rolled into a compact bundle weighing less than twenty-five pounds and carried easily on the shoulder or on a sled.

The fishing gear itself is very simple; hand-made tip-ups of cross-stick variety, equipped with line, weighted spreader and two hooks. When the fish are biting well, three tip-ups per man are adequate, but on slow days five or more are commonly used. The preferred bait is the Lake Erie emerald shiner, but in periods of scarcity most all local species of minnows have been used with limited success. Other items normally carried are a small charcoal stove, ice creepers, a spud chisel for chopping holes and a skimmer for cleaning slush and ice from the holes.

The composition and weight of the fish in the bag have declined greatly in recent years with the advent of the fishermen's lament—smelt. Prior to the arrival of these prolific pests, sizeable jack perch and blue and yellow pike (walleyes) were the common species taken, and fifty to one hundred in the aggregate was considered a good day's catch. Often a few ling (lawyer) or eel pots (local name) add to these prized species. But in recent years, the smelt haunt the fisherman wherever they chop in and the catches of the old favorites have declined drastically. Many of the old timers have given up the sport as a lost cause. However, these annoying little critters have given rise to a new ice-fishing set—the smelters! Since these fish are everywhere, the fisherman need only to venture a short distance from shore and chop in. The hazards are few, the effort considerably less and the total take is high; catches of two hundred and more are common. Many parents have found smelting a safe, easy way for the entire family to enjoy ice fishing and the kiddies rarely become dismayed for lack of action. We might add, too, that smelt, fried to a golden brown in deep fat, are mighty hard to beat at the dinner table.

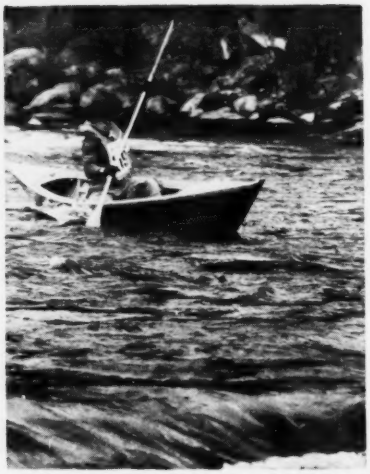
The abundance of smelt and the waning populations of pike and perch are prime topics among western New York fishermen and conjecture is generally pessimistic about the return of the "old days." But eruptive populations of wild creatures often wane as abruptly as they climb and perhaps this could occur with the smelt. However, in many parts of the country, smelt are highly prized fish and perhaps those who cry are simply shackled with a prejudice that is denying them the pleasure of harvesting a bountiful natural resource. Perhaps a new generation of ice fishermen, initiated under the reign of the smelt, will accept the species without bias or prejudice and will receive as much or more pleasure and enjoyment in the great out of doors as did the old timers in the hey-day of pike and perch. Time will tell.

Hudson River

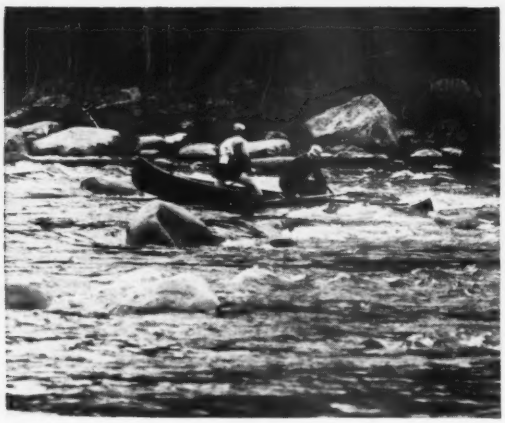
Downriver Race

by Nick

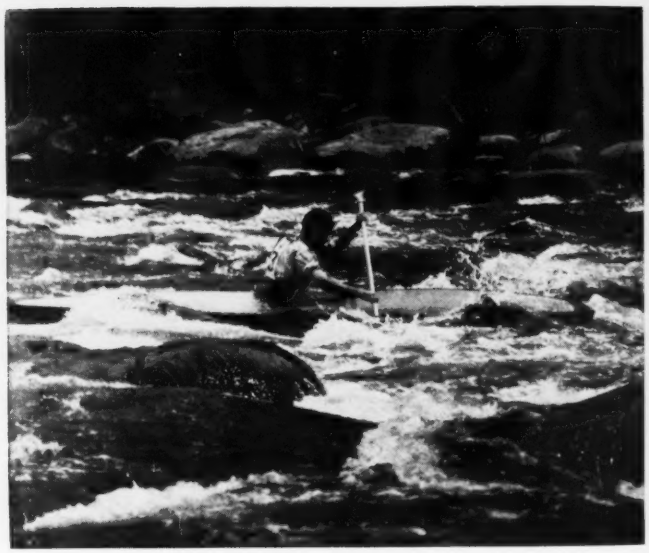
Downriver race from North Creek to Riparius is 7 and one-half miles of treacherous white water



One of the oddities of the downriver race was this wooden "you name it"



Stuck on a rock



Right: Paul Bruhin (F-1 class) in action. Paul finished first in 1959; repeated in '60. Time: 1 hr., 6 min., 20 sec.

AT North River, the Hudson pours out of the Adirondacks, falling 500 feet in 22 miles from Newcomb to North River, emerging as a roaring white water giant—clear, cold and pure enough to drink—a cataract 60 yards wide, full of tricky cross-currents, back eddies and three-foot waves rolling over huge submerged boulders.

For three springs now, (this year will mark the fourth) this has been the setting for the Hudson River White Water Derby, fast becoming the East's biggest canoeing attraction on the white water calendar.

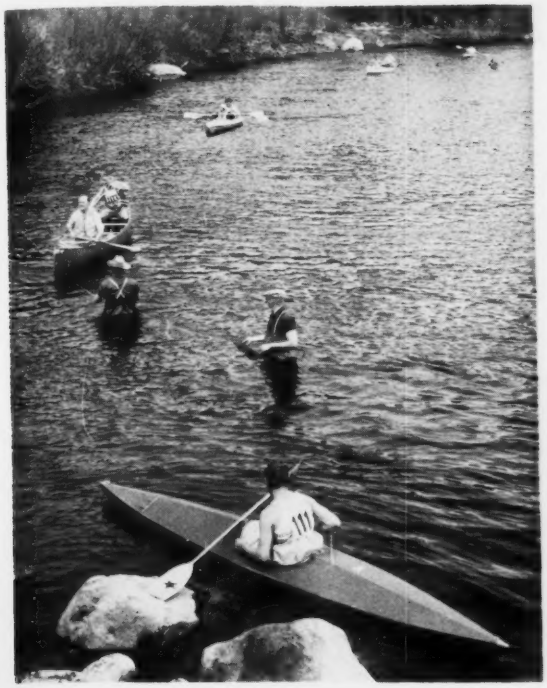
The Johnsburg Fish and Game Club, sponsor of this increasingly popular event, first cooked up the idea in 1958. That spring there were 24 craft entered in the 7½ mile downriver race. Then in 1959, the Committee added a giant slalom, attracting a total entry of 104; more than three times the first year's score. Last year it grew again, winding up with participants from six different states and two Canadian provinces.

Maybe the best feature is the spectacular show the white water derby provides for spectators. Last year nearly a thousand watchers lined the river to witness the most impressive and thrilling 2½ mile giant slalom race against time from North River over a course designed to tax and delight the most expert of canoeists.

White Water Derby

Giant Slalom

Drahos



Contestants line up for start of race

Typical gate. Boat must go through without touching poles, otherwise time penalties are added to the total racing time

Number 14—navigated in reverse—was one of the trickiest gates of the course; a challenge for the most expert canoeist

Emerging from the Reverse Gate, canoeist must cross river, enter Gate 16, then make a loop around pole marked Gate 17

The 1960 derby was a two-day affair, with two major races — the 2½ mile giant slalom (with a novice slalom for the less expert) and the 7½ mile downriver race from North Creek to Riparius. Both races have classifications for single and double occupants; canoe or folbot. The best times for the 1960 races were:

Downriver Race

F-1	Class	1 hr., 6 min., 20 sec.
F-2	"	1 hr., 21 min.
C-1	"	1 hr., 33 min., 43 sec.
C-2	"	1 hr., 11 min., 33 sec.

*F denotes folbots with 1 or 2 occupants.
**C denotes canoes with 1 or 2 occupants.

Giant Slalom

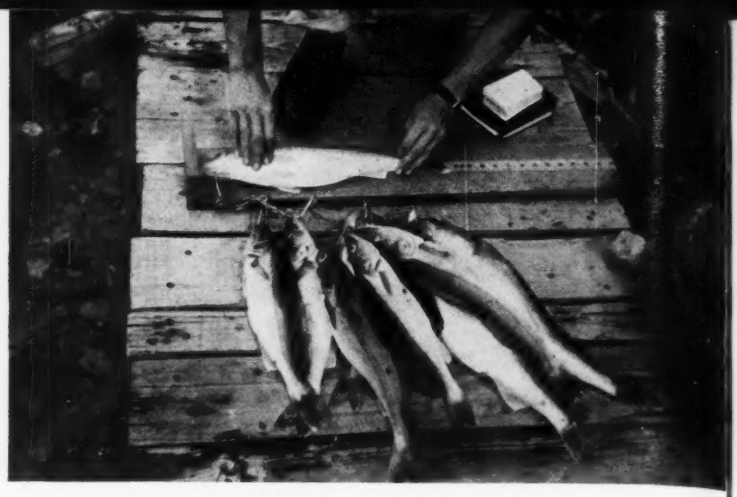
*F-1	Class	9 min., 1 sec.
F-2	"	18 min., 34 sec.
**C-1	"	18 min., 9 sec.
C-2	"	12 min., 38 sec.

Come May 13, 14, white water men will be gathering again at North Creek to pit their skill against the clock, each other and the clear rushing waters of the upper Hudson during the 4th Annual White Water Derby. Want to enter—or spectate? We're sure the sponsors will be happy to pass along details if you wish to write to the Secretary, White Water Race Committee, North Creek, N.Y. There's plenty of water for all comers.

On Saturday, the 13th of May, prior to the opening of the Novice and Giant Slalom races, a memorial plaque to the old time river drivers will be dedicated at North River.

Oneida Lake Walleyes

by J. L. Forney and A. W. Eipper,
Department of Conservation,
Cornell University



Biologist checks a catch of Oneida walleyes. Lengths and scale samples provide data on growth, age, survival

FOUR years ago, the New York State Conservation Department and Cornell University, with financial aid from the U. S. Fish and Wildlife Service, initiated a long-term fisheries research program on Oneida Lake. Basic objective of this study is to obtain biological information needed to manage warm-water lakes for maximum annual harvest of desirable species without endangering future crops. Despite Oneida's size (80 square miles) and the variety of fish it produces (some 60 different kinds), considerable information has already been obtained on various aspects of the Oneida Lake fishery. The purpose of this report is to summarize data now available from the first four years' work on the walleye, Oneida's most important game fish. (1)

Fishing Success

An important initial aim of the study was to determine the total angling catch of walleyes and other fish. From 3,000 to 6,000 fishing parties were contacted each year to determine the number of fish caught and the length of time fished. To make the sampling of fishermen representative, interviews were conducted throughout the open season, at different times of the day, at night and under all weather conditions.

The average number of man-hours required to catch a walleye during daylight hours in the summer season was: 1956—4 hours; 1957—23 hours; 1958—15 hours; 1959—3 hours.

Fishing success at night, and in the winter ice fishing, was appreciably higher each year but the trends were the same—good fishing in 1956 and '59, poor in 1957 and '58. Three hours to catch a walleye may not seem like good fishing; however, these figures compare favorably with those reported for highly-rated midwestern walleye lakes.

To determine the total catch of walleyes we needed one more piece of information—the number of hours fished. Estimates of total man-hours were calculated from interview data plus counts of boats made at frequent intervals from a 70-foot tower at Shackelton Point. The accuracy of these counts was checked against counts made simultaneously from a 'plane and the tower. A similar procedure was used to estimate the number of hours ice fishermen fished in winter. Total man-hours spent on Oneida Lake were:

Man-hours Fished

Year	*Summer*	*Winter*	*Total*
1957..	774,000	37,000	811,000
1958..	629,000	108,000	737,000
1959..	1,152,000	96,000	1,248,000

Fishing pressure per acre ranged from 15 man-hours in 1957 to 26 in 1959. This probably represents fairly heavy fishing pressure for a lake of 50,000 acres, although no comparable information for other lakes of this size is available. Fishing pressures of 50 to 100 man-hours per acre are common on small lakes; however, few lakes with fishing pressures in this range provide satisfactory walleye fishing.

From fisherman interviews and fisherman counts, total numbers of fish caught were calculated:

Estimated Oneida Lake Catch

Year	*Walleye*	*Yellow Perch*	*Sm. Bass*	*Other Fish*
1957..	40,000	256,000	17,000	92,000
1958..	113,000	142,000	18,000	63,000
1959..	468,000	196,000	31,000	74,000

Note: Catch estimates are for the period May 1 to March 1 of the following year.

Oneida Lake fishermen—and they are legion—have long tried to guess why walleyed pike fishing, for which this lake is famous, could be so good one year, almost a waste of time the next. Here, in this report of the first four years of an intensive research study of Oneida Lake's fish and fishermen, are some of the answers. We think you will be amazed at many of these findings and impressed at how many factors are at work to determine how successful your fishing trip may be.—Editor

Although no one needs conduct a census to prove that fishing success varies from year to year, the magnitude of fluctuations in walleye catch from Oneida Lake is surprising. The walleye catch in the summer of 1959 was 11 times as great as the 1957 catch. The 1959 catch of 468,000 Oneida walleyes —about 650,000 pounds—is an impressive figure, especially when we consider that New York State's total reported commercial catch of walleyes in 1958 was only 230,000 pounds, including the catch of blue pike in Lakes Erie and Ontario. To interpret these catch figures properly, and understand their biological significance, we need information on population size.

Population Trends

Population estimates were made by fin-clipping walleyes of legal size (2) netted by the Oneida Hatchery for spawn-taking operations in April. In the following summer and fall, each year,

(1) Methods used to obtain information on Oneida Lake fish were described in the June-July, 1957 issue of THE CONSERVATIONIST.

4,000 to 7,000 walleyes were examined for clipped fins. From the ratio of marked to unmarked walleyes in these samples, the total population of legal-size walleyes present in April of each year was estimated at:

Estimated Walleye Population

Year	*Number of Legal-size Walleyes*
1957.....	230,000
1958.....	1,020,000
1959.....	920,000
1960.....	440,000

The low spring population of 230,000 in 1957 followed a year in which fishing success was very high. The limited fishing census conducted in 1956 indicates the catch in that year was at least 250,000 walleyes, which is greater than the population remaining in the spring of 1957. Between April, 1957 and 1958, the population increased from 230,000 to 1,020,000 then declined slightly to 920,000 in the spring of 1959. The population dropped to 440,000 in the spring of 1960, following the 1959 season when the catch reached 468,000 walleyes.

The number of walleyes caught by anglers has an important and direct effect on the population size. But, population size does not seem to be the only factor which determines whether fishing is good or poor. Fishing in terms of man-hours required to catch a walleye was five times better in 1959 than in 1958, although the walleye population was slightly larger in 1958.

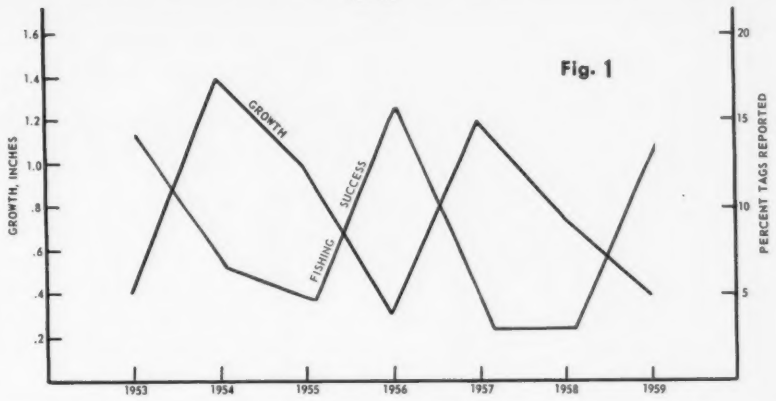
Poorest fishing occurred in 1957, when the population of legal-size fish was increasing. Changes in the vulnerability of walleyes to angling probably result from fluctuations in food abundance.

Food Supply

The best index of food supply for the walleye population is their average growth during the year. The average annual increase in length of adult walleyes (5 to 9 years old) for each year since 1953 is shown by the black line in the first graph (Fig. 1). Also shown is the fishing quality (color line), as indicated by the percentage of tags placed on walleyes in a given calendar year that were returned by fishermen that year. Years in which growth was poor—1953, 1956 and 1959—were years in which fishing success was high. Each year of good fishing was followed by a

(2) Although size limits on walleyes have now been removed, a minimum legal length of 12 inches was in effect through 1960.

AVERAGE GROWTH OF ADULT WALLEYES, AND FISHING SUCCESS INDICATED BY PERCENTAGES OF TAGS REPORTED
1953-1959



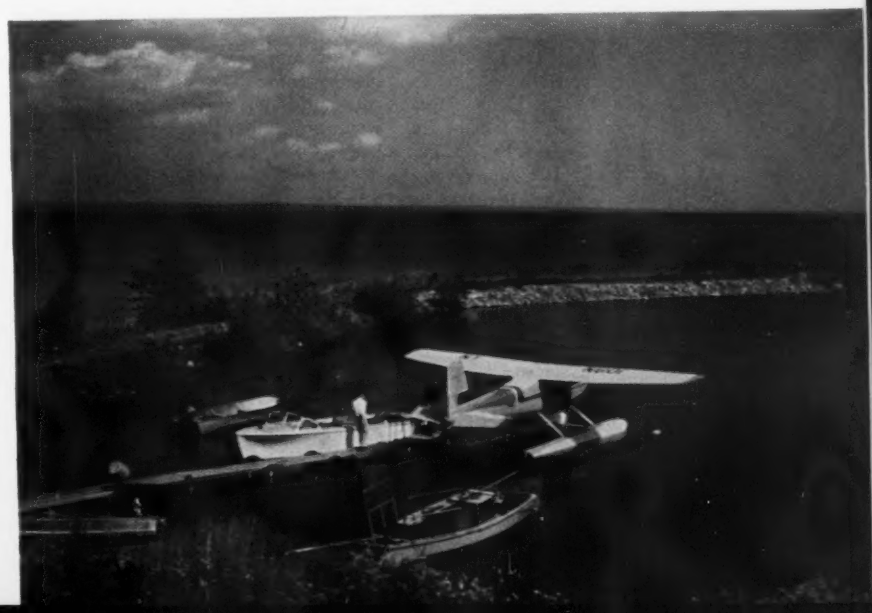
year of exceptionally rapid growth and poor fishing. The removal of a large proportion of the walleyes in one year might be expected to increase the food supply of the remaining walleyes, resulting in good growth and poor fishing the following year. Whether this is the complete explanation for changes in fishing success cannot be proven, but it is apparent that changes in the food supply as indicated by growth may result in poor fishing even when fish are abundant.

Survival

The number of legal-size walleyes present in Oneida Lake each year is determined by the number added by growth, number removed by fishermen and losses from natural causes. In 1956 anglers were catching and releasing many under-sized walleyes and these 10- to 12-inch walleyes were also abundant in experimental nets. Examination of the scales indicated these fish had hatched in 1954. Growth was rapid in the summer of 1957 and in that year these 10- to 12-inch walleyes reached legal size with inches to spare. Thus the increase in population between 1957 and '58 can be traced directly to an exceptionally good hatch in the spring of 1954.

The subsequent decline of the population can also be explained with a knowledge of hatching success and angling catch. The strong 1954 hatch, which boosted the population to a peak level by adding 800,000 legal-size walleyes in 1957, was followed by poor hatches in 1955 and in 1956. Most of the 1955 hatch reached legal size in 1958 but it added only 56,000 walleyes. This did not compensate for the loss of fish by angling (113,000) and natural deaths (about 50,000), and as a result the population declined slightly to 920,000 in the spring of 1959. Survivors of the 1956 hatch which reached legal size in 1959 were also very scarce, while the

Schakelton Point on Oneida's south shore offers snug harbor for field station research craft



NUMBERS OF LEGAL-SIZE WALLEYES PRESENT AT THE START, NUMBERS WHICH REACHED LEGAL SIZE, AND NUMBERS OF LEGAL WALLEYES REMOVED FROM THE ONEIDA LAKE POPULATION
1957-1959

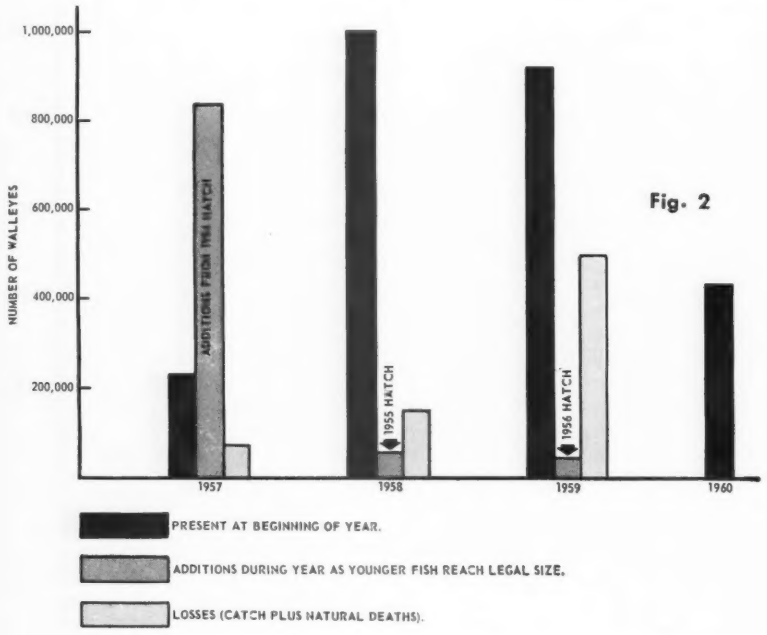


Fig. 2

angling catch in 1959 approached half a million. As a result, the population dropped from 920,000 in the spring of 1959 to 440,000 in the spring of 1960. These trends are shown in the accompanying bar graph. (Fig. 2).

The percentage of adult walleyes that die from natural causes is very low, possibly only 5 per cent annually. In contrast, trout populations and populations of pan fish frequently have annual natural death rates of 25 to 40 per cent, and natural deaths may exceed the angling catch. Because of the high catch rate and low natural mortality in Oneida Lake, about 80 out of every 100 walleyes which reach a length of 12 inches are eventually caught by anglers. But during the first year or two of life young walleyes, like most kinds of fish, experience very heavy losses.

Environmental conditions are apparently much more favorable for survival of young walleyes in some years than in others. For example, the 1954 hatch contributed about 14 times as many legal-sized walleyes as the 1955 hatch did. One objective of research now being conducted in Oneida Lake is to determine the factors which limit the survival of young fish. The relative abundance of young walleyes is being estimated each year and at different times during the year. Numbers of young walleyes taken in experimental nets will be compared with the numbers of fry stocked, amount of food available and abundance of other kinds of fish. Through these comparisons we hope to determine the factors which affect survival of young and thus control the number of walleyes which reach catchable size. Eventually it may be possible to modify conditions in the lake to assure a reasonably high survival each year.

After four years we have considerable insight into some of the mechanisms causing large fluctuations in Oneida walleye fishing, but much is still unknown. For those unfamiliar with research problems faced by biologists, this provides a good example of the complexities involved in finding solutions. Studies thus far have measured man's effect, primarily as an angler, on the walleye in Oneida Lake. It is far more difficult to determine the effects of other kinds of fish, food supplies, pollution and other factors on the size of the walleye population. Yet we must learn enough about these relationships to discover some that can be altered by man to provide better fishing for an ever increasing number of fishermen.

Some
of

NEW York State, believe it or not, is the right answer to *all* these questions.

To these distinctions may be added the facts that New York State also produces ores of iron, lead, zinc and silver; that it mines sizeable quantities of such important non-metallic minerals as salt, wollastonite, pyrite, trap rock, slate, marble, limestone, dolomite, granite, bluestone, shale, clay, sand and gravel; that it is a substantial producer of petroleum and natural gas; that it ranks ninth in the country in the diversity of its mineral products and that in 1955 the total value of its mineral production was nearly $217,000,000, thereby ranking it eighteenth among all the states of the nation.

It has been said that man first began to make use of minerals when he fashioned weapons and implements from stone to initiate the Paleolithic Age. But the importance of minerals can be traced much farther back, to the very beginnings of life on the earth. We believe that the first living things formed in the oceans, but not until the minerals needed to sustain life were dissolved from the rocks of the earth's crust and transported by rains and rivers into the ocean basin. And on land, no life was possible until weathering of the minerals in the rocks provided the elements needed to form soils and support the growth of plants, which in turn made possible the existence of animal life.

Thus far, we have used the terms rocks and minerals interchangeably, as they often are in economic geology. As a rule, however, geologists make this distinction: The solid crust of the earth is said to consist of rocks, which are large masses of the crust that appear to be fairly uniform in composition over a considerable area. Thus we have areas of granite rock, limestone rock, marble, schist, shale, sandstone, etc. But on close examination we find our rocks to be composed of crystals, grains or fragments of materials which we call minerals. Thus we have quartz, feldspar, mica, augite, hornblende, garnet, calcite, etc. As a rule, rocks contain two or more minerals. Minerals have very definite physical and chemical properties and crystalline structure. Rocks, on the other hand, may vary a good deal in their composition, for

Rocks and Minerals New York

by Samuel N. Namowitz

Where is the world's largest titanium mine?

Where is the largest garnet mine in the world?

Which state is the largest producer of industrial talc?

Who produces all the abrasive emery used in the United States?

Which state is the second largest producer of gypsum in the nation?

rocks are mixtures or aggregates of minerals, rather than true compounds.

The geologist classifies rocks as *igneous*, *sedimentary*, or *metamorphic*, according to origin. *Igneous* rocks are those that formed by the cooling of hot molten material from within the earth's crust. The hot molten material is called magma while it is inside the crust, and lava when it erupts out of the crust. From magmas cooled inside the crust we derive such igneous rocks as granite, diorite and gabbro. From lava we may derive such rocks as obsidian, basalt, rhyolite and pumice. Each one of these rocks consists of minerals. Granite, for example, is made up principally of quartz, feldspar and mica or hornblende. Gabbro consists largely of feldspar and augite. Other minerals common in igneous rocks are olivine and magnetite.

When rocks are attacked by the agents of weathering and erosion, some of the minerals are dissolved and carried off in solution. As a rule, however, the bulk of the rock crumbles and decays into fragments such as pebbles, sands and clays. Carried off and redeposited by rivers, winds, waves and shore currents, these *sediments* may become consolidated into *sedimentary rocks* such as conglomerate, sandstone and shale. The pebbles of conglomerate and the sand grains of sandstone are most likely to be fragments of quartz, bound together by natural cements of lime, silica or iron. When iron is the cement, the rock is yellowish or brownish in color. Limestone may be formed when the calcite dissolved in ocean waters is precipitated through chemical action or extracted by shell-forming organisms whose remains accumulate on the sea floor.

Metamorphic rocks are formed when rocks already in existence — igneous rocks, sedimentary rocks, or even other metamorphic rocks — are changed by great heat, enormous pressures or chemical influences within the earth's crust into rocks with somewhat different characteristics or even different minerals. Thus limestone may be transformed into marble, sandstone into quartzite, bituminous coal into anthracite, granite into gneiss and shale into slate or schist or gneiss, depending on the conditions under which metamorphism occurs. In all but the last case, the minerals may remain essentially the same, and the principal changes take place in such characteristics as density, hardness, cleavage and crystallinity. But when shale changes to schist or gneiss through intense metamorphism, many new minerals may result. Among the minerals prominent in metamorphic rocks are quartz, feldspar, mica, talc, graphite, hornblende, calcite, epidote, chlorite, garnet and serpentine.

The Rock Cycle

We are all familiar with the water cycle in nature, wherein we trace the history of a drop of water as it evaporates from the ocean surface, rises to become part of a cloud, falls as rain or snow and then runs back over the land to rejoin its ocean source. Similarly, we have the carbon cycle, the nitrogen cycle and others. To these the geologist adds the rock cycle in which we go from magma to igneous rock, from igneous rock to sediment, from sediment to sedimentary rocks, from sedimentary rock to metamorphic rock, and even if metamorphism is intense enough from metamorphic rock back to magma. Of course, there are "short cuts" in the cycle, too. Sedimentary rock and metamorphic rock may weather directly into sediments. Igneous rock may be converted into metamorphic rock. But whether the cycle is the full one, or is subject to short cuts, the overall process is the same. It is one in which solid rock turns to sediment and is then transformed into rock again, over and over through the ages. And even as the cycle repeats itself, so does the rocky surface of the continents change in form under the ceaseless attack of the agents of weathering and erosion that pound and crumble the rock into fragmented form.

In this picture of breakdown and restoration of the rocks of the earth's crust, it might appear that the rocks and their constituent minerals are rearranged or reshuffled from time to time, but never lost. This may, in nature, be true of the elements in the rocks, but not of their mineral composition, for both chemical weathering and metamorphism alter these as rocks pass through their cycle. When man enters the picture and removes minerals from the rocks, they may be lost to the rock cycle forever—at least for all practical purposes.

To quote from a New York State Science Service publication:

"Minerals are nonrenewable resources. Man cannot grow a coal mine by planting a lump of coal. Unlike plant and animal resources, mineral resources are nonrenewable and sometimes occur only in limited amounts. It is vitally important to national and world economy that they be used wisely for the benefit of all mankind. Conservation measures which may be applied include improved mining methods to reduce waste and make it possible to use lower grade ores, development of by-products, use of substitutes for the rarer minerals, wise use of the finished products by consumers and, finally, effective methods of salvaging."

The centerspread painting by artist H. Wayne Trimm shows some representative rocks and minerals of New York State. These are briefly described and their localities indicated in the succeeding paragraphs.

Garnet

This is the name given to a family of minerals frequently found in igneous and metamorphic rocks. Most garnets are aluminum silicates combined with iron, calcium, magnesium or manganese. Garnets are hard minerals, with a range of 6.5 to 7.5 in Mohs' scale of mineral hardness. (Since Mohs' scale will be referred to for all minerals, it is given herewith):

1. Talc (softest)
2. Gypsum
3. Calcite
4. Fluorite
5. Apatite
6. Orthoclase feldspar
7. Quartz
8. Topaz
9. Corundum
10. Diamond (hardest)

Garnets may be dark red, brown, black, green or yellow. Clear crystals are used as gems. Massive garnet is crushed for use as an abrasive.

In New York State, garnet is a frequent constituent of metamorphic rocks throughout the Adirondacks. The world's largest garnet mine is located at North Creek in Warren County. Occasional crystals in this deposit may be more than two feet in diameter, but most have diameters under two inches. These garnets are highly fractured and break into pieces with sharp cutting edges. This fact, together with its hardness, makes North Creek's garnet useful for abrasive purposes, either as a grinding stone or as garnet paper for the polishing industries.

Limonite

This is a soft mineral formed by the weathering of minerals containing iron. It is common as the "gossan" which is the weathered capping of veins or masses of pyrite. Most limonite is impure goethite [FeO(OH)] and the name limonite is most conveniently used as a field term to refer to natural hydrous iron oxides whose real identity is uncertain. Limonite may be yellow, brown, red or black. Yellow and brown limonites cause the yellow color of many clays, soils and weathered rocks. Limonite finds commercial use as iron ore. It may also be ground into paint pigments known as yellow ocher, sienna and burnt umber.

In New York State, small scattered limonitic ore bodies formed the basis for an iron ore industry which prospered during the period 1850-1900 in Dutchess and Columbia counties. There are no mines now in operation.

Sillimanite

Is an aluminum silicate mineral with the formula Al_2SiO_5. Its hardness is 6 to 7. It usually forms long thin needle-like crystals or radiating formations. Its luster is glassy; its colors brown, gray, greenish or white. Sillimanite occurs principally in such metamorphic rocks as gneiss, mica schist and quartzite. In New York it can be found in Westchester, Monroe and St. Lawrence counties. The specimen illustrated (center spread) comes from Benson Mines, Star Lake, St. Lawrence County. Sillimanite is used commercially as a refractory and in spark plugs.

Muscovite

Also known as white mica or isinglass. Muscovite is a complex silicate mineral which includes aluminum, potassium and hydrogen in its composition. It has a hardness of about 2.5—between gypsum and calcite. Its flat shiny flakes are common in granites, gneisses and schists. It may also occur in some limestones and sandstones. Muscovite of commercial importance is found in dikes of the coarse granite known as pegmatite. Here the muscovite may form common flat crystals or "books" many feet in diameter and of considerable thickness. These "books" can be split into thin flexible sheets which are particularly valuable as electrical insulators in such devices as capacitors, radio tubes, aircraft spark plugs, toasters, irons, electronic and electrical appliances. Ground mica is used in lubricants, in special paints and in the manufacture of plastics.

Mica deposits of possible commercial value have been identified in Orange, Putnam, Westchester, Essex, Saratoga, Warren, Jefferson and St. Lawrence counties. For the most part, however, these sources are unable to compete with sources in other states and in Canada, India and Madagascar, from which we now import most of our mica needs.

Calcite

Is a common mineral with the formula $CaCo_3$, calcium carbonate. Pure calcite is white or colorless, but traces of dissolved impurities produce varieties of almost every color. Calcite is number 3 in Mohs' hardness scale. A drop of dilute hydrochloric acid will react with calcite to generate carbon dioxide gas. The effervescence thus produced easily identifies calcite in what is known as the "acid test." Calcite usually has a glassy or pearly luster and breaks readily when dropped or struck, into smooth six-sided rhombohedrons.

Iceland spar is a colorless transparent variety of calcite through which double images are seen. This property known as double refraction, is put to use in optical instruments like the polarizing microscope.

Calcite is the principal constituent—often the only one—of limestone and marble. It also occurs in veins that fill cracks and cavities in igneous and sedimentary rocks, as the cementing material in many sandstones and conglomerates; as cave deposits such as stalactites, stalagmites and incrustrations; mixed with clay and sand in the deposit called *marl*; as porous *travertine* deposited around mineral springs; and as *onyx*. Marl and limestone are of great commercial importance in the making of cement, mortar, concrete, glass and iron. Limestone and marble are used as building stones and marble is used as a monumental stone. Limestones occur in many parts of New York State.

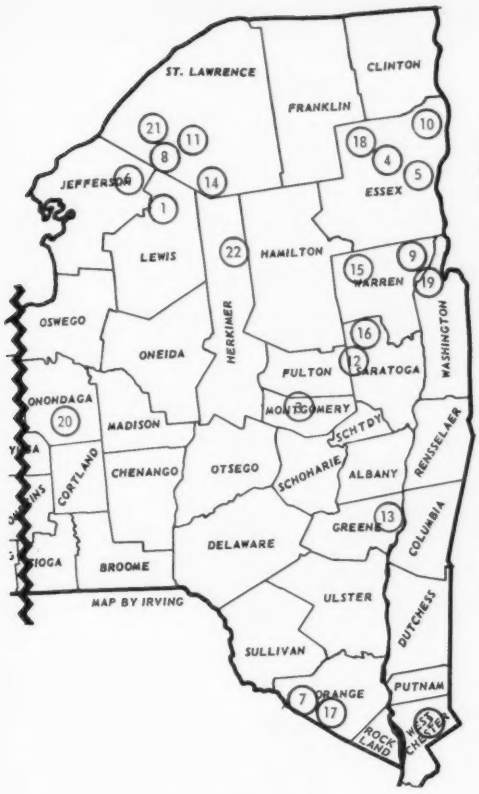
Marbles occur in Jefferson, St. Lawrence, Lewis, Warren and Essex counties, all in the Adirondack region. Marbles have also been worked in Westchester and Dutchess counties. The pink calcite illustrated here comes from Sterlingbush, Lewis County. (A grotto showing the natural occurrence of this beautiful crystalline calcite forms an unusual display in the New York State Museum at Albany).

Tourmaline

A very complex silicate mineral frequently found in pegmatite dikes, in such metamorphic rocks as gneiss and schist and in crystalline limestones and dolomites. Tourmaline ranges from 7 to 7.5 in hardness. While black and brown are the most common colors, tourmaline may also be red, green, yellow, gray or white. Some varieties of tourmaline show zones of different colors. Red tourmaline is usually called *rubellite*. Tourmaline finds some commercial use as a semi-precious gem stone. The tourmalines illustrated here come from Conklingville, Saratoga County (single crystal) and Edenville, Orange County (group of crystals). Excellent crystals of black tourmaline are found at Pierrepont Manor in Jefferson County.

Pyrite

Pyrite is iron disulfide, FeS_2. It is a pale brass to golden yellow mineral with a hardness of about 6. Known as fool's gold because of its color, it is the most abundant and widespread sulfide mineral, being found in many varieties of rock, and often in vein deposits. Its chief use is in the manufacture of sulfuric acid. Although little pyrite is produced in New York State today, it was



LEGEND

AREAS WHERE ROCKS AND MINERALS ILLUSTRATED IN CENTER SPREAD AND DESCRIBED HERE ARE FOUND.

1.	Calcite	Sterlingbush, Lewis Co.
2.	Beryl	Bedford, Westchester Co.
3.	Quartz	Randall, Montgomery Co.
4.	Labradorite	Keene, Essex Co.
5.	Magnetite	Mineville, Essex Co.
6.	Hematite	Antwerp, Jefferson Co.
7.	Limonite and Chondrodite	Amity, Orange Co.
8.	Pyrite and Sphalerite	Fowler, St. Lawrence Co.
9.	Graphite	Hague, Warren Co.
10.	Wollastonite	Willsboro, Essex Co.
11.	Talc	Talcville, St. Lawrence Co.
12.	Muscovite	Batchellerville, Saratoga Co.
13.	Chert (flint)	Coeszackie, Green Co.
14.	Sillimanite	Star Lake, St. Lawrence Co.
15.	Garnet	North Creek, Warren Co.
16.	Tourmaline (single crystal)	Conklingville, Saratoga Co.
17.	Tourmaline (crystal group)	Edenville, Orange Co.
18.	Garnet gneiss	Whiteface Mt., Essex Co.
19.	Conglomerate	Clemons, Washington Co.
20.	Gypsum rock	Jamesville, Onondaga Co.
21.	Marble	Gouverneur, St. Lawrence Co.
22.	Charnokite	Eagle Bay, Herkimer Co.

formerly mined from the gneisses and schists in the northwestern Adirondacks between Antwerp and Canton. A deposit of pyrite was also worked at Anthony's Nose in the Hudson Highlands, north of Peekskill. Since 1920, the entire New York output of pyrite has been as a by-product of the mining of *sphalerite*, a zinc sulfide ore, in St. Lawrence County. The pyrite illustrated here comes from Hague, Warren County.

Hematite

This is iron oxide, Fe_2O_3. Its name, meaning blood stone, refers to its red color, although hematite may also be black. Hematite has a hardness of about 6. It is probably the most important of all iron ores and at one time was mined for this purpose in St. Lawrence and Jefferson counties. At present, New York hematite is mined for use only as a red mineral paint pigment, the mine being operated by the Clinton Metallic Paint Company at Clinton in Oneida County. The hematite illustrated here is from Antwerp, Jefferson County.

Gypsum

Gypsum is hydrous calcium sulfate, with the formula $CaSO_4 . 2H_2O$. Occurring abundantly in extensive sedimentary deposits, gypsum is regarded as both a mineral and a rock. Gypsum is number 2 in the scale of hardness, and is usually white, gray, yellow or pink. Transparent colorless crystals are called *selenite;* a silky fibrous variety is called *satin spar;* a compact grainy variety is called *rock gypsum;* a marble-like variety is *alabaster*. When gypsum is heated until three-fourths of its water is driven off, it crumbles into the powder we call plaster of Paris. Gypsum has many uses, particularly in the making of Portland cement, building plasters, wallboard and as fertilizer.

More than one million tons of gypsum are mined annually in New York State, making the state the second largest producer in the United States. Active mines are located near Akron and Clarence Center in Erie County, Oakfield and Wheatfield Station in Genesee County, Gates and Garbutt in Monroe County and Victor in Ontario County. The gypsum rock shown here is from the Alvord Mine at Jamesville, Onondaga County.

Quartz

Quartz is a mineral which is second only to feldspar in its abundance and widespread distribution. It is silicon dioxide, SiO_2. Quartz is number 7 in the scale of hardness, making it the hardest common mineral. Pure quartz is colorless, the crystalline variety being known as rock crystal or rhinestone. Milky quartz is white, rose quartz is pink, amethyst is purple, smoky quartz is gray-brown—to mention but a few varieties of colored quartz. Quartz is the principal mineral of most sandstones and all quartzites, and it is an important part of all granites. Most sands and gravels consist largely of chips of quartz weathered from quartz-bearing rocks.

Quartz has many important uses, inclusive of making glass, concrete and abrasives. Quartz crystals are used in radio and television transmitters and in standard clocks. Quartz and its varieties are also used as semi-precious stones, like the "Herkimer Diamonds" of Herkimer County. Sand and gravel for local construction purposes are quarried or dug in almost every part of New York State. The commercial production of sandstone for millstones, once important in the Shawangunk Mountains of southern New York, is now extinct, but small amounts of sandstone are still quarried for use as flagging.

The specimen of quartz shown here is from Randall, Montgomery County.

Beryl

Beryl is a beryllium aluminum silicate. Common beryl is grayish white, yellowish or bluish green. Gem varieties of transparent beryl are familiar to us by name as the green *emerald*, the bluish *aquamarine*, the pink to red *morganite*, and *golden beryl*. Beryl has a hardness of 7.5 to 8. Beryl's principal use today is as a source of the important metal beryllium. Beryllium is used for X-ray tube windows and is alloyed with copper, aluminum and other metals to prevent corrosion and improve such qualities as toughness and elasticity. Common beryl has been produced in New York State as a by-product from pegmatite bodies being worked for quartz and feldspar at the Bedford quarry in Westchester County and the Batchellerville quarry in Saratoga County. The specimen shown here is from Bedford.

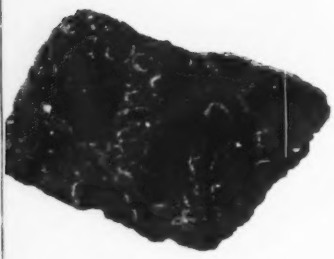
Talc

Talc is the softest mineral in Mohs' scale of hardness. It is a hydrous magnesium silicate, usually white, light gray or light green in color, with a marked soapy feel. It is easily ground or flaked into "talcum powder." Talc is a fairly common mineral in metamorphic rocks, and the rock *soapstone* is a compact variety of talc. In New York State, talc

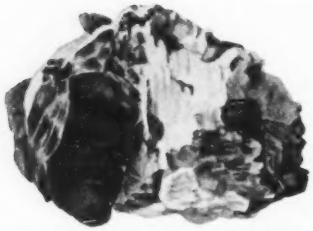
(Continued on page 26)

SOME ROCKS AN

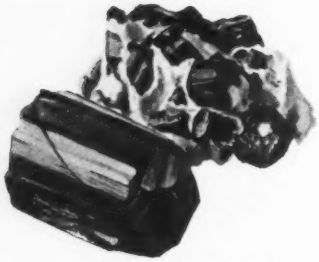
OF NEW Y



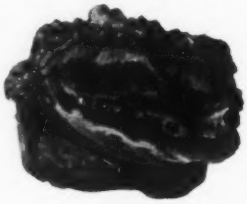
RED GARNET (mineral)



PEGMATITE (rock) (white mica, quartz, feldspar)



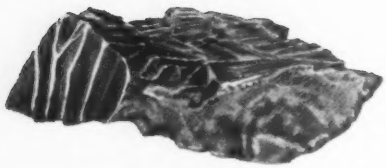
TOURMALINE (mineral)



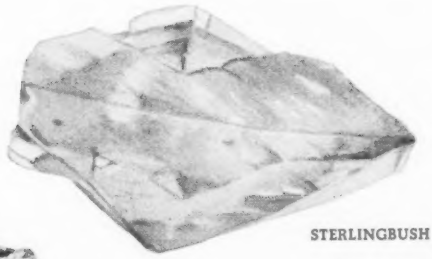
HEMATITE (mineral)

LIMONITE (mineral)

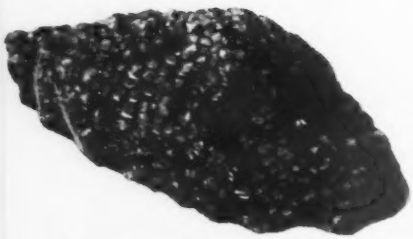
QUARTZ CRYSTALS (mineral)



GYPSUM (rock)

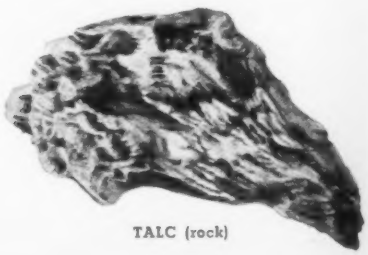


STERLINGBUSH CALCITE (mineral)



PYRITE AND SPHALERITE (mineral)

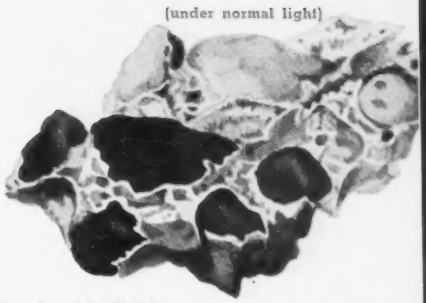
BERYL (mineral)



TALC (rock)

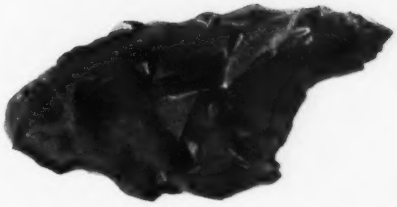
AND MINERALS

W YORK

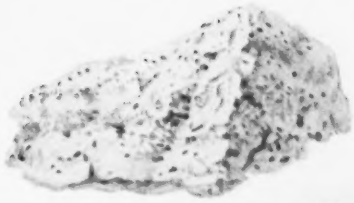


(under normal light)

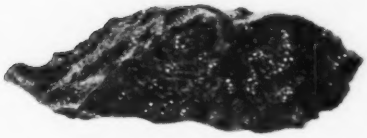
(under ultraviolet light)
CALCITE-CEMENTED CONGLOMERATE (rock)



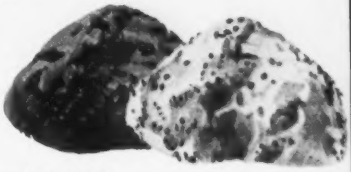
FLINT (rock)



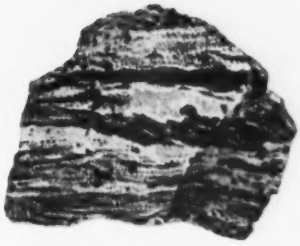
WOLLASTONITE (mineral)



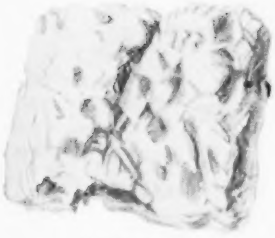
CHARNOKITE (rock)



(under ultraviolet light)
CHONDRODITE IN MARBLE (mineral)
(under normal lig

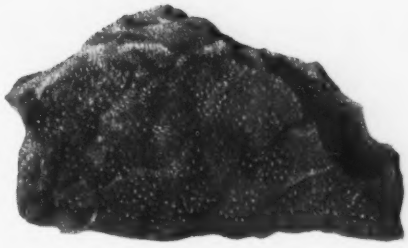


GNEISS (rock)

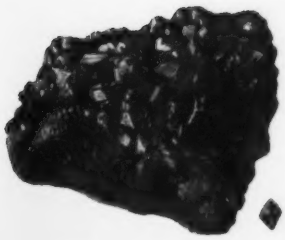


MARBLE (rock)

LABRADORESCENCE IN ANORTHOSITE (rock)

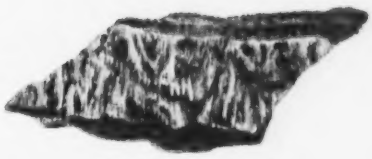


GRAPHITIC SCHIST (rock)



MAGNETITE (mineral)

GYPSUM CRYSTALS (mineral)
(showing phosphorescence
following exposure to ultraviolet light)



SILLIMANITE (mineral)

deposits occur as beds ranging up to 50 feet in thickness, associated with crystalline limestones and schists, in Jefferson, Lewis and St. Lawrence counties. New York State is the leading talc producing state in the United States, its talc being used in making paint, ceramics, rubber, roofing, paper, toilet preparations and other assorted products. The specimen shown here is from Talcville, St. Lawrence County.

Magnetite

Magnetite is magnetic iron oxide, Fe_3O_4. It is a black mineral with hardness from 5.5 to 6.5, and occurs in small grains or crystals in many igneous rocks. The black grains of magnetite are also common constituents of beach sands, from which they can be removed by a magnet, hence the name. *Lodestone* is a highly magnetic variety of magnetite. Where magnetite is found in large quantities, it becomes an important ore of iron. In New York State, magnetite mining was an important industry in the Hudson Highlands from colonial times until 1931, when the last of some 26 mines was closed. Nevertheless, New York State today ranks high as a producer of iron ore as a result of the revival and development of magnetite mining in the Adirondacks since World War II. The Benson Mines at Benson in St. Lawrence County constitute the largest open-cut magnetite mining operation in the world. The specimen shown here is from Mineville, Essex County.

Emery

Emery is a natural mixture of magnetite with corundum. Since corundum has a hardness of number 9 in Mohs' scale, emery is a valuable abrasive. The entire national output of natural emery comes from mines near Peekskill and Croton in Westchester County.

Chert (Flint)

Chert and flint are hard compact varieties of quartz, SiO_2, in the form of microscopic crystals. The mineralogist describes them as cryptocrystalline. The terms chert and flint are often used interchangeably, but the New York State Museum recommends that chert be used as the geological term, and flint be reserved for artifacts. Chert occurs in limestones, dolomites and shales in the form of dense hard nodules or layers. Its colors are gray, smoky brown or brownish black. Because it splits easily and leaves sharp edges, it was used by primitive peoples to make arrowheads, knives and other implements. The specimen shown here is from Flint Mine Hill, Coxsackie, Greene County.

Chondrodite

Chondrodite is a complex magnesium silicate mineral found commonly in marbles or crystalline limestones metamorphosed by contact with hot magma. It may be brown, yellow or red and has a hardness of 6 to 6.5. Its luster is glassy or resinous. The specimen shown here comes from Gouverneur, St. Lawrence County.

Wollastonite

Wollastonite is calcium silicate, $CaSiO_3$. It is usually white or gray, has a silky luster and a hardness of 4 to 5. Wollastonite has the unique property, when crushed, of forming short needle-like fibers, no matter how far the crushing is carried. This property helps make it useful as a filler in the making of paper, paint, rubber and other materials. It is also used in making rock wool. Wollastonite occurs in granite, basalt and especially in limestones metamorphosed to silicated marbles by intrusions of hot magma. The Willsboro area, Essex County, New York State has the only commercial deposit of wollastonite east of California. The specimen shown here is from Willsboro.

Labradorite

Labradorite is a variety of feldspar. It is a sodium-calcium aluminum silicate. Its colors are dark gray, brown or greenish, but when a specimen is turned it exhibits a beautiful play of bluish colors known as *labradorescence*. Labradorite is found in such igneous rocks as gabbro, diabase and basalt. The specimen shown here is from Keene, Essex County, in the Adirondacks.

Graphite

Graphite is native carbon, but unlike the diamond, which is also carbon, the bonds between its atoms are weak, and graphite is as soft as talc. Graphite's uses are as "lead" in lead pencils, as a lubricant, in the making of graphite crucibles, in paints and polishes, in foundry facings and in atomic piles. Graphite mining was once a thriving industry in the eastern Adirondacks, but it died in 1941, unable to compete with foreign sources in Ceylon, Madagascar, Korea and Mexico. Graphite deposits are widespread through Essex, Warren, Washington and Saratoga counties. Graphite is dark gray or black, has a metallic luster and a greasy feel. It occurs in dikes, veins, masses and as flakes in schists, gneisses, crystalline limestones and granites. The specimen shown here is from Hague in Warren County.

Gneiss

Gneiss is a coarse-grained metamorphic rock in which bands rich in light-colored minerals (quartz and feldspar) alternate with bands composed mainly of dark-colored minerals (biotite mica, hornblende, etc.). This banding may be inherited from the original layered sedimentary rock or it may be the result of plastic flow of the rock material during metamorphism. Gneisses are the most important rocks of the Hudson Highlands and the Adirondacks. Large crystals formed in metamorphic rocks are called metacrysts. The specimen of gneiss shown here contains metacrysts of garnet and may be called garnet gneiss. Its locality is Whiteface Mountain, Essex County.

Marble

Marble is a rock composed chiefly of calcite, $CaCO_3$, or occasionally dolomite $CaMg(CO_3)_2$. It is formed by the metamorphism of limestone. Pure marble is white, but traces of impurities are sufficient to streak and color the rock. Active marble quarries formerly existed in the Adirondack region of Jefferson, Lewis, St. Lawrence, Warren and Essex counties and south of Plattsburgh. Black limestone—not true marbles—were once quarried at Glens Falls, and serpentine—known as verde antique—was once quarried in Essex and Westchester counties and on Staten Island. The marble shown here is from Gouverneur, St. Lawrence County.

Conglomerate

Conglomerate, a cemented mass of pebbles and sand, is a sedimentary rock. Prominent New York conglomerates are the Olean conglomerate with its large rounded quartz pebbles, the Oneida conglomerate of east central New York and the Shawangunk conglomerate of Ulster and Orange counties, once extensively used for millstones. The conglomerate shown here is from Clemons, Washington County, and is distinguished for the fact that its calcite cement is fluorescent.

Charnokite

Charnokite is a quartz-feldspar gneiss containing the mineral hypersthene. It derives its name from Job Charnock, founder of Calcutta, India, whose tombstone was the first specimen of the rock to be described. Hypersthene is a member of the pyroxene family of minerals. Its hardness is 5 to 6, its colors black, brownish black or green, its luster pearly. It may display a coppery iridescence. The specimen of charnokite shown here is from Eagle Bay, Herkimer County. *(Continued on page 37)*

Forest Recreation Research

— A New Undertaking by the U. S. Forest Service

by Hubert D. Burke, Research Center Leader, U. S. Forest Service

A new research center was established by the U. S. Forest Service[1] at Warren, Pa., in 1959, to study problems of forest recreation in the twelve Northeastern states. This research is a new undertaking for the Forest Service, made necessary by the increasing demands of people for more and better facilities for picnicking, camping, swimming and other recreational uses of forest land.

Here, in the thickly populated Northeast, these growing demands for forest recreation often put pressure on forest lands that are already being used for other purposes—for water, wildlife and timber. The Forest Service has a going program of research on the other uses of forest land. Research in recreation will provide a well-rounded research program to help meet the Forest Service's responsibility for devising an integrated pattern of forest land management—multiple use —which in turn will assure *all* of the forest benefits needed by the people.

Program Approach

An overall program for recreation research in the Northeast was recently outlined by Lane[2]. The five research tasks which he recognized are: (1) To determine user preferences; (2) to determine how to measure recreation use: (3) to develop guides and criteria for selecting and developing new recreation areas; (4) to determine how recreation can be integrated and harmonized with timber, water and wildlife; and (5) to establish pilot operation areas for outdoor recreation research.

However, upon actual entry into this new program of research, the staff at Warren found it necessary to further define and expand the tasks or problems presented in the above program. This took them as a first step, to the libraries to survey the literature and to find out what studies had already been done. The second step has been to use the literature and other information in the preparation of a rather detailed regional problem analysis. And the third step has been to get started on a number of preliminary studies in support of the overall program.

Hubert D. Burke, author of this article, is in charge of the Northeastern Forest Experiment Station's new research center at Warren, Pa., which has begun studies of forest recreation problems.—Editor

One of the most important and challenging questions that emerged early from the library survey and from early attempts to complete certain facets of the problem analysis was: What do recreationists need and want? Campsites, picnic areas, swimming beaches, hiking trails and ski slopes have been provided in many places. Yet the fact that they have been provided does not necessarily mean that they are exactly what people want.

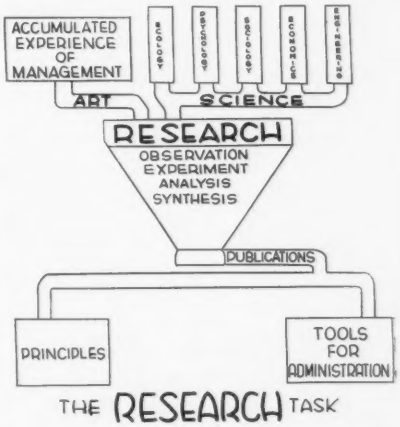
In an attempt to find answers to this and similar questions, the Warren research staff interviewed recreation administrators at several recreation areas in western New York, the Adirondacks and the Catskills. Studies are also being made on the National Forests in the Northeast and additional ones are planned in co-operation with other federal agencies, states and private owners.

Another way of getting at the problem of recreation needs and wants is to ask for an expression from the users themselves. The first approach planned here is to survey high school groups, garden clubs, labor unions and various sportsmen's and conservation groups for expressions of user preference.

It was recognized early that forest recreation research might be more complex than most forest research problems. However, granted that forest recreation does differ from the other forest uses—timber, water and wildlife—research in this field must draw knowledge from some of the established arts and sciences such as silviculture, horticulture, soil science, hydrology and ecology; forest engineering has direct applications in roads and structures for recreational uses; and forest economists can turn their talents to studies of investments and returns.

Yet beyond these the forest recreation researcher is also dealing with people and their needs and desires. This brings him in touch with psychology, sociology and population dynamics. All these and other related fields of knowledge will have something to contribute in solving the problems of forest recreation.

Another important source of help lies in the accumulated practical experience of management *(Fig. 1)*. Park planners, administrators and managers; foresters; wildlife managers; landscape architects; highway engineers; and others can all help. Such men engaged in the day-to-day practical application of recreation can help to point out some of the problems that the research man should tackle. Often the practical experience of these people will also give the research man a clue to the best priority for his studies and the form in which results can be most useful.



THE RESEARCH TASK

Managers are not only an important source of information and advice, they are also the primary users of the results of recreation research. Progress depends upon a two-way flow of ideas and information. Research results are of no value until they are accepted by management, adapted to the conditions of the various management units and applied. Planners, administrators and managers of recreation have their time filled with day-to-day problems, whereas researchers are given the time, training and facilities to isolate specific problems and to persist in the study of those problems until reliable answers can be obtained.

In order to make the answers to research problems available to a wide

(1) This new research center at Warren is operated by the Forest Service's Northeastern Forest Experiment Station, Upper Darby, Pa.

(2) Lane, Richard D. Northeastern forests: "We See Them for the People." Soc. Amer. Foresters Proc. 1959: 75-77. 1960.

group of users, and reasonably permanent, they are usually published in technical journals. Results are also sometimes presented in more popular periodicals so the public may know which problems are receiving attention and also because both management and research need the understanding and support of interested people.

Specific Problems

If space for forest recreation were unlimited, if natural beauty abounded everywhere and did not deteriorate with use and if recreation and sanitary facilities were plentiful and always designed to the needs of the people, recreation research would not be necessary. But, with things as they are, there is much that must be learned about the use of space, the development and preservation of beauty and the design of facilities to meet the needs and desires of people.

Space

Research cannot create space. But, it can accomplish a little of the same thing if it can show the way to more efficient and pleasing use of existing space. The first pressing need is to provide more space for people who wish to enjoy the forest enviroment. If a part of this need can be met by better design and use of available space, some of the pressure will be relieved. Farsighted men are working to acquire more recreation space for the public. However, the most effective use must also be made of this new land when it is obtained—because more may not be readily available.

The need for more camping space is one of the immediate problems. Research can perform no magic here, but there are some things that can be done to assist in relieving this situation. One is to learn more about people. In answers to questionnaires, people frequently say they want more privacy and greater spacing of campsites. Yet, in practice they often bunch up into compact groups and leave widely spaced campsites unused or only partially filled.

One federal agency uses three campsites per acre as a standard for spacing. One state spaces tents as close as 25 feet—without too many complaints. A range of spacing is undoubtedly best, but what should this range be? How much of each portion of the range is needed?

It appears that people who do a lot of camping desire to be more isolated but this is not always true. Dispersed areas cost more per camper for space, trails, water and toilet facilities. Greater spacing may become somewhat more economical if less expensive facilities can be developed. Yet, it is unlikely that the space or land problem will change much for the better.

Recreation planners need a means for estimating the potential demand for forest recreation upon a given area. This is especially important to communities, because they may need to know the impact of such things as new roads, water impoundments, ski lifts and other installations upon recreation demand in their area. For example, a new highway can have a drastic effect on recreation; at one place in the Northeast, a new throughway drained off much of the recreation from an area where it had been stable for many years. The demand for recreation was transferred to another already crowded area leaving many facilities in the older area unused.

Except for hunting, space in forests managed for timber production is little used by recreationists. For this reason these forests provide one of the best areas for expansion of recreation space.

Timber-producing forests can be as interesting and beautiful as the virgin forests with their ancient giants. The timber-producing forest often contains a wide variety of tree ages; and the openings caused by occasional cutting allows a rich cover of shrubs, grasses and flowers to cover the forest floor. Even clear-cut areas in the forest, which for a few months after cutting may look like total destruction, soon begin to provide berries, fruit and cover for wildlife as well as room for the new forest to grow.

Foresters now supervise timber cutting on federal and state forests as well as on much of the private holdings. And under a system of partial cutting the new forests will often be more attractive and suited to recreation than the old ones that they replace.

Some change of attitudes may be necessary before such forests can be made available for recreation. Too many recreationists have been led to think of timber growing and harvesting as an evil that thwarts recreational use. On the other hand, some timber growers think of recreationists as a nuisance.

The solution to this research problem is to learn how best to interpret and present the timber-producing forest to the people so that they may understand its utility and importance for producing wood and at the same time, to see its beauty, see and appreciate its promise and understand their own responsibility in making use of this new space for recreation.

Privately-owned forests are usually timber-producing forests. Hunters and fishermen use these forests free of charge or at very little cost. As other recreationists learn to appreciate the beauty of timber-producing forests, it also follows that they will have a greater interest in recreation on privately-owned forests too.

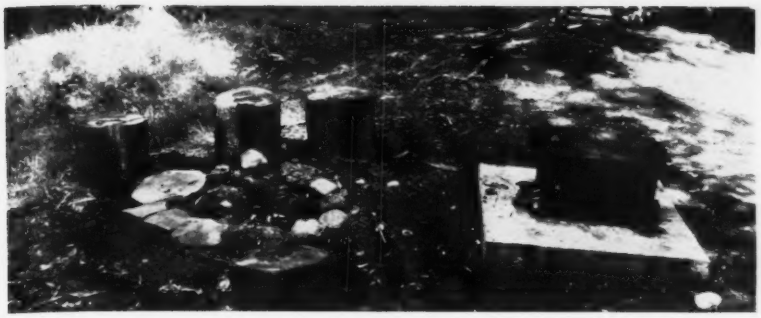
No matter how willing the private owner is to co-operate in letting his lands be used, he faces some very real problems. Research can help with some of them. For example, the forest owner must decide whether or not he can afford to bear the added cost for such improvements as garbage and sewage disposal, added road and fire protection, as well as certain liabilities such as the user of his forest who falls out of a tree or over a cliff and sues him for damages.

Studies in the economics of forest recreation will help private owners to decide how much to charge, how large a camp ground must be before the cost of collecting fees is greater than the collection is worth and how to guide investment in various types of recreation facilities. These and similar questions when answered, should make it possible to increase recreation space through the use of privately-owned forest lands.

Natural Beauty

Research can make an immediate contribution to the preservation of beauty in nature by developing improved methods for retarding soil erosion and preventing plant deterioration on recreation areas. Improved methods for rehabilitation of badly worn areas are also needed *(see picture)*.

Measuring soil compaction



Actual use is proof of good design—or poor design, if not used

Many people could make better use of the leisure time they spend in the forest. In order to meet this need, research should select and test the most promising means for opening and broadening new frontiers of knowledge and interest in the forest environment. This might result in more efficient use of space as well as an increase in beauty—simply by reaching into new dimensions of interest.

Expanding interests are especially important to the large and growing group of older citizens. Much money and effort is spent providing for the strong and active younger citizens by installing such facilities as ski tows and swimming areas. Not so much provision is made for the less active.

Let us look for a moment at some of the possibilities for a retired couple who have begun to use their new leisure to visit the forest. At first their only interest may be the beauty of the landscape. But their area of interest and enjoyment can be increased enormously if they learn something about the trees, flowers and shrubs. And if bird, insect and other animal life is interpreted well enough to capture their interest, years of fascinating observation and study can be theirs.

However, the job of recreation research is not one of interpreting birds and other natural life. This should be the work of nature groups made up of highly competent citizens formed into clubs and associations covering all of these fields. The research job should be to select and test the best means of bridging the gap between the casual observer's and the amateur student's attitudes toward these fascinating things.

Esthetic values depend upon individual taste, so it is impossible to establish absolute esthetic rules. Nevertheless, it may be possible to obtain general principles and guides for increasing beauty in the forest by studying how people respond to forest environment. These studies would aid in the selection, planning and development of recreation areas, roadside zones and other recreation facilities designed to help the recreationist enjoy the forest.

Facilities

It is in the design of picnic tables, gates, signs, trails, parking spaces, toilets and garbage disposal that the native ingenuity of recreation managers has been most prolific. It appears that everyone connected with forest recreation has designed at least one new item. This fact alone must indicate dissastisfaction with much of the present design of facilities *(see picture)*.

The picnic table could be the subject for a very simple and useful test. These tables are subjected to weathering, carving, decay, staining, hacking, scorching and a few additional hazards. To find the best table-top material, various kinds of wood and other materials can be built into tables and used side by side for comparision. The tables would be put to use under the same conditions and the ones that stood up the best could be selected. A short report would be prepared showing the results, together with the costs for each type. Recreation administrators could then choose the type that best fitted their needs and budget. In this same study it also might be good to consider user comfort because a great majority of picnic tables now in use seem to have been designed only for the lean and long-legged.

Artificial sand beaches constructed on reservoirs are very expensive to build and maintain because sand often has to be hauled many miles. Most swimming areas have attractive sand beaches. There is some question, however, as to how much these are used. Preliminary studies show that a few tiny children usually play on the sand at the very edge of the water. A few boys build sand castles or bury themselves or each other. Most of the rest of the people apparently prefer to sun themselves on the turf where they will not get sand on their blankets and swimming suits. From a casual survey it appears that the only moisture that touched a considerable number of swimming suits was a stray drop or two of suntan lotion.

If further studies show that the sand beach is not actually used as much as it had been thought to be, park planners might well decide to reduce sand-beach areas in favor of the more desirable turf. A fenced wading pool and sandpile could provide for tiny tots. The reduction in the lifeguard force, who then would not have to watch the little folks, might allow for a wading-pool supervisor to be hired, permitting mothers of young children a few moments of relaxation. Such changes are being considered by some planners now, but they could move more surely if they had better information on people's desires.

Engineers know how to build highways, roads and trails, but often the highway-type roads are also built in recreation areas. Highways are built to move trucks and autos swiftly, smoothly and safely from place to place. But recreation roads should be built to move autos, bicycles, people walking and sometimes horses at a leisurely pace, the purpose being enjoyment rather than speed. Better specifications are needed to provide for foot and bicycle traffic at the edge of recreation roads and for low-standard roads that are dust free.

Water supply and sewage disposal in recreation areas are not a problem where city water and sewage systems are available or where the concentrations of campers or picnickers are sufficient to justify similar systems. Provisions for these necessities is another matter on more dispersed forest recreation areas.

One specific improvement that is needed is a satisfactory sewage disposal point for self-contained travel and house trailers. People pay substantial prices for these trailers; then, upon arrival at the forest they often find that the self-contained unit cannot be used because there is no place for sewage disposal. Some park and forest authorities even seal the toilets of trailers having self-contained units. A more satisfactory solution would be to install sewage disposal points for them. This would add relatively inexpensive camping space, because self-contained trailer areas could be set up without the need for on-the-ground toilets.

Summary

This short introduction to the subject can only serve to point out a few of the things that forest-recreation research is or should be doing. To summarize, it is the job of forest recreation research to become familiar with the situation, study the problems, find the answers, and give the results to the men who plan and administer forest recreation. The general public will not often read or see the results of research directly. Results are usually seen indirectly as they assist administrators to make better use of funds or to manage the areas for the greater pleasure and inspiration of the users.

Great Brook Watershed — A Community in Action

by G. Claire Herting, Work Unit Conservationist, Soil Conservation Service

DRIVE east from Norwich on Route 23 and you'll climb a long hill toward the rising sun. At the top, on the right of the road you'll see a small sign announcing that you are now entering the Great Brook Watershed.

Let's say it's June, and you are in no rush, so stop a moment atop the hill and look down across the valley. You'll see well kept pastures and sleek cattle contentedly grazing; trim, fenced woodlots; lush crops of hay and grain, ruffled by the warm summer breeze. You'll see clear, flowing streams and, across the valley, farm ponds shimmer in the early light of the sun.

You will feel, we think, that here is a peaceful, secure and happy valley. You would be right, too, made so by the people who live here. And that brings us back to the little sign by the side of the road—"Great Brook Watershed." What that sign doesn't say, but could, is that the people of this valley, through their own will, determination and intelligence, through conservation of their soils and waters, reversed a trend that threatened the survival of two valley communities—South New Berlin and Holmesville—jeopardized 4,000 acres of the best land of the valley, sapped the tax base of the whole area and promised destruction of their schools and churches, leaving nothing but a ghost community.

Has this been the work of generations? No, almost unbelievably, it all began in the fall of 1952. The Chenango County Soil Conservation District Directors, and through them, personnel of the Soil Conservation Service, were invited to a meeting in South New Berlin to determine if anything could be done to show the value of establishing soil and water conservation practices on the land in the Great Brook Watershed. Additional technical help was promised for the area if the landowners were interested in installing soil and water conservation practices.

Dairy farming, the leading industry in the Great Brook Valley, had been slipping since World War II. Milk had been dropping in price to the wholesaler, but the cost of living was going up. Extension of credit by a bank or lending institution to anyone in a Southern Tier County was hard to obtain, especially by hill farmers, and most of the farms in the Great Brook Watershed were classified as hill farms. The landowners decided that something must be done, but where could they start?

Small group meetings were recommended to find out if the landowners were interested in the benefits the soil conservation program had to offer. The first group meeting of farmers in the watershed was held at the Graves home in October, 1952. That's the farm right near that hill-top sign when you stopped to look out over the valley. Mr. Graves invited some of the neighbors to come to his home to discuss what they could do to hold the raindrops where they fell. Eight neighboring farmers came by truck or car, interested in finding out what new fangled thing was being planned in their community.

Mr. Graves introduced each of his neighbors as they arrived. Anson White was there as Chairman of the Chenango County Soil Conservation District Directors. Mr. White explained the set-up of the District, how the District could furnish technical assistance to the landowners who were willing to co-operate with the District, the assistance which the District could give in helping each co-operator obtain equipment which might be necessary to establish conservation practices and that all of this assistance should be based on a Conservation Plan for each acre of the co-operator's farm.

As Mr. White, a farmer on a large farm in an adjoining watershed, as well as a district director, talked with the group of farmers, he told them that the District was not fighting a battle for them but that, given the chance, the Chenango County Soil Conservation District would fight *with* them to improve the grassland, the woodland, the cropland and the wildlife on their farms—if the landowners wanted it. He told them that he believed a watershed program would help them to raise better crops and, through better crops, to produce milk at a lower cost. With milk produced at a lower cost, more money would be available to purchase new machinery, new automobiles, refrigerators, television sets, new clothes, make necessary repairs on their farm buildings, pay taxes and support the church of their choice.

Two of the landowners present were co-operators with the District. The others signed agreements with the District and outlined the boundaries of their farms on large aerial maps which had been brought to the meeting. Mr. White told the landowners that all the Conservation Plans were based on two things, (1) the soil each man had in each field on his farm, and (2) on his farm enterprise. A map showing the soil in each field was available to each district co-operator. Then a technician from the Soil Conservation Service explained the soils maps and how the soils affected the crops.

Charts were used to show types of soils, root depths, ground water flow, availability of food and air for the plants, effect of slope on the loss of raindrops, cropping patterns, use of seed, fertilizer and lime according to soil type, and how soil conditions could be corrected by simple conservation measures which they could do on their farm at very little cost and without the use of heavy machinery.

Dates were set up for the Soil Conservation Service technicians to visit each farm and assist the farmer with his Conservation Plan—going as far with the Plan as the farmer wanted to go at the time.

This group meeting was followed by others, until all of the landowners in the watershed had been given an opportunity to learn about the program starting in the Great Brook Watershed. Perhaps it was the pie, cake and coffee served by the landowners and their wives at each meeting; perhaps the fear of a ghost community, or, maybe just wanting to know what was going on—at any rate, the landowners who attended the group meetings became co-operators and wanted to get started on the Conservation Plan for their land. This was true whether they had a half acre as some of the landowners in Amblerville or more than 600 acres like Kenton Robinson and Mortimer Brooks. At the end of a few weeks of effort on the part of the landowners and the district directors, 95

The Great Brook watershed

per cent of the landowners in the watershed had become co-operators with the Chenango County Soil Conservation District and the Great Brook Conservation Co-operators, and were ready to get at least one conservation practice started on each farm.

It didn't take long for the landowners in the watershed to realize that some form of organization was necessary if they planned to work together to get the job done. Before the end of 1952, they had called a meeting of the landowners in the watershed and elected officers and directors. Thomas (Tommy) Boyce was elected the first president. Recognizing that the entire program depended on people, the organization set out to interest those in the watershed first; then, to interest as many individuals, organizations, groups, clubs, etc. as they could in their program. A meeting of co-operators and interested people was held in February, 1953 with about forty present. This has been continued each year as an annual affair, with 150 present in 1960.

A community meeting was planned at the Court House in Norwich to enlist the co-operation of the bankers, feed, fertilizer and seed dealers, machinery dealers, town and county governments, federal and state agencies, clubs and individuals interested in agriculture. Twenty-six groups were represented at this meeting and heard the plans for the Great Brook Watershed.

Spring of 1953 saw new activity on many of the farms. Pasture land was being improved, small areas at first; legume and grass seed adapted to the soil were being used, trees were planted and wildlife shrubs were planted for food. Neighbor talked to neighbor about the conservation plans for his farm. As the evidence of the work being done began to show, other landowners became interested. Additional allotment of funds to assist the farmers in the watershed was made available for cost-sharing through the Agricultural Conservation Program.

A field day, sponsored by the Unadilla Valley Grange in South New Berlin, was planned on the Mort Brooks farm by the officers and directors of the watershed so that other landowners outside the watershed could see machinery establishing conservation practices on the land. Three thousand men, women and children from far and near came to see the activities. Land was cleared for pasture, a pond was constructed to supply water for the cattle, a wildlife marsh was constructed as a stopping place for ducks and geese, open drainage ditches, grassed waterways, diversion ditches and tile drainage were installed to control the movement of water. The lime, fertilizer, seed, machinery and equipment dealers all helped to plan and then worked together to get a job done. The interest in the community and the desire to show what each landowner could do on his own farm was rewarded on August 16, 1953 when the Great Brook Watershed was chosen by the U. S. Department of Agriculture as No. 1 Pilot Watershed in the United States.

Before the end of 1954, the interest in watersheds created by the activity in Great Brook had inspired landowners and interested groups in both the Canasawacta and Genegantslet watersheds to request comparable assistance under Public Law 566. Representatives from other districts heard about the activity, came to see the conservation practices which had been established, to talk with the landowners, to return home and tell others about the things they had seen.

The Conservation Caravan from Buffalo, with students of conservation, made four trips into the watershed to learn about the activity, the participation of the landowners and the results. Students taking advanced work in geography at Syracuse University, or natural resources at Oneonta State Teachers' College, came to study the soil, the crops and the results of applying conservation.

Boy Scout troops and 4-H clubs held field days of their own where they spent half of the day building small log dams, planting roses and other shrubs to establish soil and water conservation practices and the remainder of the day visiting conservation practices already established, to determine the value to the landowner and the community. Groups of school children from Oneonta, and from schools in Chenango County, came to learn more about soil and water conservation. At all of the field days, and on all of the tours, the officers and many other co-operators in the Brook, were the proud landowners who told the groups of the splendid results they had secured on their farm after they had established the soil and water conservation practices.

One of the difficulties encountered at the start of the program was the lack of money to buy lime, fertilizer or quality seeds. Little by little, a few acres at a time, the farmers obtained sufficient funds to improve pasture, the most necessary item in their farming program. As each acre was improved, it brought in more funds to improve more acres. Soon funds were available to construct farm ponds, diversion ditches, protected outlets and other essential farm conservation practices.

Co-operators like Mortimer and Florence Brooks, on whose farm the first field day was held in 1953, invited the watershed officers to hold four more field days on the same farm so that each succeeding year the results from the preceding year, or years, could be studied. This farm has been in the Brooks name for more than one hundred years. The oldest son, Jerry, is now at home to carry on the Brooks tradition through the fifth generation. More than 75 acres of pasture have been improved on this farm. In this dairy community, grass for pasture and hay is the most important item. Emphasis was placed on the improvement of the grass program from the start of the watershed activity. Mr. Brooks says: "These improved pastures give me a better milk yield even in the middle of the summer. That's the difference between profit and loss to me. All this has cost me money, but it is paying off now. Under the present conditions in farming, no one can afford not to improve his pastures if he wants to stay in farming."

A neighbor of Brooks, Orville Alsip, has one side of his farm, about forty acres, improved for pasture. The hillside is divided into small fields on the contour, where the cows graze on the level instead of up and down the hill. Mr. Alsip gladly tells those who stop to talk with him: "The pasture improvement, especially the dividing of the pasture into small fields, has greatly improved the quality and amount of pasture for our cows, especially during July and August."

Next to Alsip are Kenneth and Hilda Herman. Ken has been a director in the organization since it was started. All of Ken's farm is on one side of the Valley.

A sleek Great Brook herd on lush pastureland

Each year, the amount of improved pasture is increased by four or five acres, along with proper fertilization and liming on the previously improved area. When asked by one touring group if he thought the present activity would continue, Ken replied: "The present landowners will continue to improve the conditions on their land and will maintain the conservation practices already established. They know the value of treating each acre according to its best use."

The president of the Great Brook Watershed Conservation Co-operators is Cyrus Pike. This is the second farm in the watershed which Cy has improved by establishing soil and water conservation practices. The first farm was too small. Cy and Betty Pike moved to this farm in 1955. That year, they did not produce sufficient feed for 16 head of milk cows. Today, he has plenty of feed for the 40 head they have in the barn. Mr. Pike tells those who stop to talk with him that it has cost him about $70 an acre to improve the 50 acres or more that he has improved besides any cost-sharing that they might have received through the Agricultural Conservation Program. Cy also says that the time and money were well spent. The cost in money has been more than repaid. Cy received the Master Conservation Farmer Award for 1960, which was given by the Norwich Rotary Club, co-operating with the Chenango County Soil Conservation District. Two other co-operators in the watershed, Kenneth Herman and Orville Alsip, were given Excellent Farmer awards for the overall conservation program they have carried out.

You will hear the same, or similar, story from one end of the watershed to the other.

Gerdt Treschow, at the upper end of

Chenango County 4-H group gathers at the school for watershed field trip

The author, leaning against tractor tire, reviews program with co-operator and his son

the watershed, has planted more than 100,000 trees on his land. "Soon as the trees are large enough, I'm going into the Christmas tree business," says Mr. Treschow. All this means good protection for the upland acres of the watershed.

Another good farmer, and past president of the watershed organization, is Walter Whitney. "I learned the hard way," says Whitney. "I watched a whole field and the seed I had just planted in it, wash down hill in a heavy rain. I soon found out, with the help of the Soil Conservation Service technician, that it was easier and better to plow in strips across the hill. I've got a lot of good conservation measures on the farm now and they all pay for themselves. I make more money than I used to, so I have more to put back into the farm." Whitney has two large ponds, each about two acres in size, and two small ponds, all of which he helped to build with his own equipment.

Other farmers, like Alf Benson, will tell you that the water used to run through his barn and barnyard before he installed one of five diversion ditches on his farm. The 60 acres of pasture improvement, with quality seeds of the correct variety, accompanied by sufficient lime and fertilizer, have helped him to pay his mortgage by producing milk at a lower cost per quart than before the watershed program was started. Also, the pasture program has brought him a better return per acre as the soils are more suitable to grow grass than other crops.

We could also mention the Thomsen farm, Fuller farm, Robinson farm, Button farm, Mitchell farm, and others where the program has been one of pasture and hayland improvement, then the establishing of ponds, ditches, etc. The answers from each one would be about the same.

Most farms up and down the Valley have one or more ponds to provide water for the cattle in this dairy section. The same ingenuity governs the use of these ponds as they used in the watershed activity. The ponds are used for swimming, boating and for that most important of all recreations—fishing.

Other conservation programs have not been forgotten. Many of the landowners have planted shrubs in odd corners of their land to provide food and protection for the wildlife. Hedgerows of multiflora rose grace the landscape in the spring with their beautiful flowers, provide shelter during the summer and food in the winter. Woodlands have been fenced to keep the cattle out of them. Yes, even flowers have been planted in dooryards to beautify the home grounds.

The Pilot Watershed program ended in 1958, but that was not the end of the program in the Great Brook Watershed. The landowners continue to carry on their program of maintenance on each acre of land that has been developed. Although the price of milk received by the farmer is low, most of the farmers try to improve four or five more acres each year.

The watershed activity was started by people with a determination to make a better place for themselves and a better community. As long as this determination prevails, we need have no fear about the future in the Great Brook Watershed, or any other area where the landowners have the same determination. The people who live in any community can determine to a great extent the kind of community in which they live—if they are willing to give a sufficient amount of their time and talents to make it possible.

The program is not one by and for the landowners alone. With a yearly income in Chenango County from the dairy industry of approximately $20 million, the landowners in the Great Brook Watershed are doing their part. This income helps to support the feed, fertilizer, seed, lime, implement, gas, oil, automobile and truck, hardware, lumber and many other dealers as well as the grocery stores, the clothing stores, drug stores, etc. It is a community project. This has been demonstrated so well in the Great Brook Watershed.

The landowners in the Great Brook Watershed, a Pilot Watershed program, have been pioneers. The information obtained in the Great Brook Watershed and other similar pilot watersheds led to the small watershed program under Public Law 566. Public Law 566 offers similar assistance to communities in New York State and throughout the nation. The Genegantslet Creek, the Conewango Creek, the Ischua Creek, the Cowascelon Creek and the Upper Five Mile Creek are but a few of the many watershed areas in New York State interested in conservation programs. More than 1,200 areas all over this great country of ours have applied for assistance in their watershed programs. More requests will follow as the responsibility for our national resources is better understood by the people who live on the land and the people who live in the small towns.

Progress in a watershed program and the conservation of soil and water will move ahead as rapidly as the people want it to advance. This was clearly shown in the Great Brook Watershed.

the back of the book

More campsite facilities

Construction is in progress to expand six of the Conservation Department's public campsites and day-use areas in eastern New York.

The Department's large Capitol District Game Management Area at Cherry Plain, Rensselaer County, will have a 25-acre lakefront tract developed for boating, bathing and picnicking. This day-use facility, to be open for public use in 1962, will accommodate 2,000 people.

Further north, the Cumberland Bay public campsite near Plattsburgh on Lake Champlain, is scheduled for a new bath house and a 1,200-car parking lot. The new bath house, which will accommodate 1,170 persons, is planned to be ready for use during the 1961 season.

The Lake Harris public campsite near Newcomb will be a new campsite of some 200 acres to be developed on Forest Preserve lands. When open for public use in 1962, it will accommodate 900 campers plus some 800 day-use people and will feature boating, bathing and fishing. A Putnam Pond campsite, near Ticonderoga, also on Forest Preserve lands, will be developed to provide facilities for 700 campers and 800 day-use people. Some day-use facilities will be available at this site for use in 1961, while the campsite proper is scheduled for opening in 1962.

The new Bowman Lake campsite near Norwich will be fully operative in 1962 with some day-use in 1961. This 200-acre facility, located on an 11,000-acre State reforestation area in Chenango County, is designed to accommodate 500 campers, plus 2,500 for day-use. This new campsite is the first to be located on a State reforestation area. It is unique too, in being the first to be developed in co-operation with the State's Department of Correction. Boys from Correction's minimum security Conservation Camp at nearby Pharsalia provided much of the labor for development of the site, including construction of 35-acre Bowman Lake.

Purple sunbirds—continued

Back in the June-July, 1959 issue, in one of our lighter moments, we left you way out in Dehra Dun, India, where a male purple sunbird was lustily singing in someone's bathroom, either bewailing or celebrating his mate's departure five days previously. There the story ended or so we thought and so our editor hoped. Such is not the case; there's more!

To bring you up to date, this purple sunbird and his mate had moved in without invitation and successfully nested on the flushing chain in the bathroom of a new Forest Resident. At the time, the room politely was left mostly to the birds.

Now, not unlike certain humans, some birds apparently take advantage of a good thing when they see it. According to the owner, the purple sunbirds reinvaded the place this year and proceeded to duplicate their act using the same props. Whether it was one or both of the original characters, some of their relatives or another generation, we probably never will know. In any event, this time the room's rightful owner decided to share it with them.

When nest construction was about complete, he removed the flushing chain with nest intact and fastened it to another nearby support. A new chain was affixed to the flushing tank and the room put to the daily use for which is was intended, except at nights so as not to disturb the nesting female.

At last report the nest contained one offspring and the parents were busy feeding it.—Roy Irving

Co-operation

The constructive rehabilitation of young men at the State Youth Rehabilitation Camp at Summitt, Schoharie County, the development of State forest lands and the improvement of public fishing streams constitute a three-way co-operative program being set up by the Department of Correction with two agencies of the Department of Conservation.

From the Foresters' point of view, the program represents a real opportunity to get on faster with the task of thinning extensive reforestation areas so that the trees remaining may produce marketable saw log timber, while the thinnings will be put to good use. The "good use" enters the picture for the Conservation Department's fisheries biologists; specifically, the stream improvement men. They are organizing to use the small dimension thinning material as posts in fence construction to protect stream banks from grazing. Larger material will be used for the construction of stream improvement devices, erosion control structures, etc.

In the past, the procurement of standing timber by the Stream Improvement Unit for fence posts and logs has largely been carried out by the purchase and cutting of stumpage on private woodlots. Material was limited to cedar and hemlock since other species cannot withstand constant wetting and drying conditions without preservative treatment.

Under the supervision of the District Foresters, Reforestation Areas will be chosen for selective cutting. The trees will be killed by chemical means which also makes the bark fall off within a year after treatment. The trees will then be cut, skidded out to loading areas and hauled to a wood preserving treatment plant to be constructed this spring at the Summit Youth Camp. The Youth Camp will supply the labor for the wood preserving process and stockpiling of material for future use. Small diameter material will provide fence posts and larger diameter poles will be used in the construction of stream improvement devices.

This project not only provides utilization of a surplus Reforestation Area product and a means of teaching men a skill and the ability to work together, but also furnishes the Fish and Game Division and the fishermen a wood material for a stream improvement structure of long lasting effectiveness.

Oyster shell reefs

A preliminary report on attracting fish by oyster shell plantings in Maryland's Chincoteague Bay may have important implications for those in other coastal states interested in concentrating fish by construction of artificial reefs.

In the Maryland project, some 2,000 bushels of oyster shells per acre were distributed fairly evenly over a two-acre test plot of water averaging seven to eight feet deep. Two other two-acre plots were staked off so that the three plots were about 2,000 feet apart. The latter were left untreated as controls.

Fish populations were trapped over planted and unplanted control areas with the same effort from August to November in 1958 and 1959. Fourteen species of salt-water fish were taken, of which the black sea bass was most abundant. The oyster shell areas yielded about three times as many fish as the control areas during the two years. Black sea bass numbers were much greater on planted areas than on control areas.

Paper storm

World use of paper and paper board amounted to 56 million metric tons in 1955. By 1965, it is estimated use will amount to 88 million metric tons, and by 1975, only 14 years hence, the demand will be for approximately 134 million tons.

Golden anniversary

The State University College of Forestry at Syracuse has reached the half-century mark and is now in its 50th academic year. The College's golden anniversary celebration activities are being scheduled for April when the forestry education-research center's campus will be the scene of a special, three-day celebration commemorating the anniversary of the founding of the institution.

Tuition-free to qualified New York State residents, the four-year, State-supported and State-administered institution of higher learning is world famous. When the College was first established by the New York State Legislature, it was clearly stated that the institution was to have three main objectives: (1) To train professional men skilled in the science, technology and art of forestry and to train semi-professional men in practical forestry vocations. (2) To seek new facts and principles, and develop methods for improved use of forests and forest products. (3) To gather and disseminate information on forestry and forest products and counsel individuals, groups and industries on using the forest and its products properly and effectively.

Academic education stonrgly tied to the practical is provided by the College, where professional training is given. The New York State Ranger School at Wanakena—a division of the College—supports the sub-professional training.

The first quarters occupied by the College of Forestry was a small room on the north side of the basement of Lyman Hall of Syracuse University. Within a year, the College had expanded into practically all the rooms in the basement of Lyman Hall, plus a large lecture room on the floor above. Six years later, the College had its own campus and its first building—William L. Bray Memorial Hall.

Today, the College's 20-acre campus consists of William L. Bray Memorial Hall, the Louis Marshall Memorial Science Building, the Hugh P. Baker Memorial Wood Products Laboratory building, the Roosevelt Wildlife Experiment Station, a pulp and paper laboratory building (a full-sized, commercial-type paper mill), a forest insectary, a forest greenhouse, and a service building.

The College's properties include: The Archer and Anna Huntington Wildlife Forest Station (totaling 15,000 acres), at Newcomb; the Charles Lathrop Pack Demonstration Forest (2,300), at Warrensburg; the Charles Lathrop Pack Experimental Forest (1,000), at Cranberry Lake; the Ranger School Forest (2,400), at Wanakena; the Syracuse Forest Experimental Forest (1,000), at Cranberry and Tully Forest (2,700), at Tully. In addition, the College maintains a full-time forest extension field office at Saranac Lake.

Starting out with only a handful of members in the beginning, the College faculty now numbers around 125, and the College's enrollment totals approximately 600 students.

At the College of Forestry, a qualified high school graduate interested in science and engineering may become a landscape architect, wood and plastics chemist, pulp and paper engineer, forest botanist and zoologist, forest products engineer, or a forest and watershed manager.

Today, graduates of the College may be found working and living not only throughout New York State and the nation, but also on almost every continent of the world.

Campsite use

New York's public campsites, including the Lake George Islands, logged another big year during the 1960 season with 2,191,967 man-days of use. The 39 campsites registered 1,522,584 camper days and 669,383 for day-users (picnickers, boaters, etc.) Individual campers numbered 366,072.

The nominal service charges for use of the public campsites contributed $335,022.58 toward their development and maintenance.

Top three campsites for total man-day use were Cumberland Bay, on Lake Champlain with 256,758; Fish Creek Ponds, popular central Adirondack site, with 169,344; and Hearthstone Point, on Lake George, with 128,910. Moffit Beach, Rogers Rock and North Lake exceeded 100,000 each, too.

Another 773,975 days of use were recorded for five other major facilities operated by the Conservation Department's Bureau of Camps and Trails. These included Lake George Beach, Lake George Battleground Park, Mt. Van Hoevenberg Bobsled Run, Belleayre Ski Center and John Boyd Thacher Park. The latter had a record 472,196 days.

"P. W. Kruetzfeldt"

"P. W. Kruetzfeldt" has been a familiar signature to those aware of cover art in THE CONSERVATIONIST. The summer bouquet, fourth cover, August-September, '58; the pink lady's slippers, second cover, April-May, '59; the cardinal flower, second cover, August-September, '59 and the bayberry and holly, first cover, December-January, '59-'60 were delightful. It was with deep regret that we learned of the death of this talented artist.

A nationally-known landscape artist and illustrator, Mrs. Pauline Wulf Kruetzfeldt was born in Holstein, Germany, and had resided for the past nine years in her studio-home, Lake Desolation Road, Saratoga Springs, where she often painted for pleasure, the pastoral and woodland scenes which bordered her home in that scenic but solitary area between Middle Grove and Lake Desolation.

Among national magazines for which she designed flower covers are the Women's Home Companion, Country Gentleman and American Home and many of her illustrations have been used in school textbooks.

THE CONSERVATIONIST will always be indebted to Mrs. Kruetzfeldt, not only for her splendid art work, but for the altruistic spirit in which her paintings were contributed.

Albert Tatum Davis

We are saddened by the sudden death of Al. Davis, January 4th, 1961. While we knew that his heart was not the strongest, we thought that his health was generally fair and his death came as a great shock to all.

Al. was born at Saranac Lake on February 8, 1888. He graduated from Colgate University in 1910 and entered the service of the Conservation Department on July 1, 1913. He retired September 1, 1959. During these 46 years with the Department, he served as Forest Ranger, Forest Surveyor, Forester and Chief Forest Surveyor. His colorful career was described in detail in the February-March, 1960, CONSERVATIONIST. This article closed with these words which seem appropriate to repeat:

"Two hundred years from now, long after the next three generations will have come and gone, his maps will be examined, his blazes boxed and the growth rings counted—his blazed lines traced over the mountains, across rivers and lakes and through forest—the trees he planted at Cold River and Long Lake as little seedlings, will stand in majestic living testimony to the fact that here was one who left the forests of New York State better than he found them."—ED. WEST

Woodcock bill

The woodcock never sees what it eats. By driving its three-inch bill into the mud, the highly sensitive tip feels earthworms upon which it feeds.

Springs

Springs—cold, clear springs bubbling from hillsides or welling up from secret depths—played an important part in the settlement of these United States from the Blue Ridge Mountains of Virginia and the Great Smokies in Tennessee to the Ozarks of Illinois, Missouri and Arkansas. An early settler, penetrating a frontier wilderness with his family and their meager possessions, traveled and searched until he found a suitable homesite. That was determined not only by the quality of the land and what grew on it but also by the availability of water and timber. Although some preferred to dig a well, fearful that the dreaded milk sickness and "the shakes" or ague might lurk in spring water, a favorite location was near some good "strong" spring.

Usually, on such a homestead, after completing a cabin and a makeshift barn, a small shelter was built over the spring. That was the "springhouse." In time, it became a masonry structure with basins thru which the water flowed. Here the milk cooled, cream was skimmed and butter, cheese, eggs, meat and other perishables were stored. They had no refrigerators then. In a way, the family life was centered around it.

Those gifts of pure water from the earth were so important that many frontier towns were plotted and built around or near "a large spring of excellent water." Today, although most of their springs are long gone, on the maps of several states you will find many towns named "something-or-other Springs."—NATURE BULLETIN, *Forest Preserve District, Cook County, Ill.*

Ambergris

Sick sperm whales accumulate a fatty, grayish substance in the intestines known as ambergris. It is valued highly as a fixative for perfume and may be worth up to $20 an ounce. One whaling crew captured a whale that was carrying around a lump of ambergris weighing 750 pounds. Sometimes the sick whale gets rid of the substance and it may be washed ashore as an ill-smelling, irregular lump of fatty material, but literally "worth its weight in gold."

Thar she blows!

The whale, on coming to the surface after a deep dive, empties its lungs of air with a mighty rush. This warm, moisture-laden breath expands in the cooler air, condensing into a geyser-like spout. It may rise twenty feet or more and can be seen for several miles.

John T. Gibbs

It is with real regret that we record the passing on December 27, 1960 of John T. Gibbs who served the Department as Secretary from 1931 to 1933, and then as Deputy Commissioner from 1933 to 1942.

During his twelve years of service with the Department, his universal kindness to all employees and his gentlemanly conduct of the highest order, earned for him equally universal respect and esteem.

He brought to the Department a fine background of experience in journalism which included service on *The Philadelphia Inquirer*, and the famous old *New York World*. This background and his writing and public relations talents served the Department well during the difficult depression years when nearly everyone had to "double in brass".

We extend to his widow, Virginia Gibbs, of 1841 Columbia Road, N.W., Washington, D. C., our deepest sympathy in her great loss.

Record load?

Over the years THE CONSERVATIONIST has published several pictures of big loads of logs hauled by horses. Here is the latest, received from William Susdorf, Forest Ranger, of Oneonta. This asserted record load of logs was photographed in 1903 in the Adirondacks, somewhere in the vicinity of Lake Placid.

Hauling such "record loads" was to the woodsman what a horse pulling contest was to the farmer in "the good old days" and many a bet has rested on the outcome. The sled load of logs had the additional disadvantage of "freezing in" but a good team and teamster had a special knack of breaking a load loose, getting it moving and keeping it moving.

According to the brief notes on the back of the original picture Mr. Dudley of Lake Placid is on the left with Henry Moody and Henry Kerr next. Edward Kerr is the reinsman—the Kerrs are from Clintonville. Also recorded on the back was the note "Load was on a slight incline." Downhill, obviously.

Some Rocks and Minerals of N. Y.

(Continued from page 26)

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Game management oddities

Problems posed by game management often inspire some real off-beat reseasch. For instance, in Louisiana they are finding out how long and how wide ditches should be in order to produce the maximum crop of muskrats for trapping, while in one western state they are concerned with the development of a chemical spray for haystacks that will keep elk from eating them but still allow cattle to feed.

Sea "farming"

Revolutionary ideas on increasing the productivity of the sea are being advanced by prominent scientists. In a recent conference, a scheme to pump air to the floor of the Gulf of St. Lawrence was discussed. The Gulf maintains a layer of warmer water near the floor and, if it could be circulated, the Gulf might remain navigable all year, the climate of Newfoundland and Nova Scotia would be tempered, and the lifting of nutrients from the bottom could increase fish production.

Another scheme: Anchor a string of buoys across the Gulf Stream bottleneck in the Florida straits and attach chains, big enough to "plow" the water. This could enrich waters with bottom sediments and increase fertility in much of the North Atlantic.

People and Land

(Continued from page 4)

Reservation of land for recreational use has been a part of our past history as a nation. There are signs that the pendulum may be starting to swing the other way. Everybody's business too often becomes nobody's business. In a democracy, government at every level is government composed of ourselves, to serve our own interests. I believe that it is very much in our interest, as individuals and as a nation, to insure everyone the means of getting back to nature now and then, to help keep our perspective, to make fruitful use of our new-found leisure, and to insure that when we alter the face of the earth we do so with calculated knowledge of the consequences, not in a spirit of blind and foolhardy exuberance. Our resources are capable of supporting an ever-increasing standard of living, but only if we manage them with understanding rather than by the easiest method of exploitation that comes to hand.

Antaeus, the giant in the ancient myth, was supposed to be unconquerable because he drew his strength direct from the earth. But Hercules lifted him away from the earth and slew him.

House of bamboo

In some parts of the world people still live in bamboo houses and in some parts of India, they convert the smaller ones, when no longer usable, into—of all things—pencils!

Forest researchers discovered that partially decayed bamboo or bamboo that had been subjected to a period of weathering, such as that in old huts and fences, was soft enough for pencil wood and in plentiful supply. Fresh bamboo was too strong and pencils made from it can not be easily sharpened with a penknife.

Pencil slats of bamboo are made by slicing and cutting the weathered bamboo into the required sizes which are then sometimes dyed. The slats are grooved with a simple marking device, leads are placed in the grooves and a similar strip glued over them. Individual pencils are separated by a blade and run through a punched steel plate to give the pencil the desired shape. After sanding the pencil is painted and ready for use.

The process does not require any costly tools, a large amount of money or extraordinary skill. For this reason the business has been suggested as a side line for villagers whenever someone's hut or fence becomes expendable.—Roy Irving

Water supply fishing

In recent years, the majority of municipal water supply lakes have been opened to fishing under enlightened water supply administration in most states. Over one million acres of municipal water supply reservoirs, constituting about 93 per cent of all such waters reported in those states, have been converted to multiple use. The majority of municipal water supplies are closed to fishing in only six states.

One of the most spectacular examples of recreational fishing on a once-closed municipal water supply is that of the 25,000-acre Quabbin Reservoir in Massachusetts. About two-thirds of this lake, built solely as a drinking water supply for metropolitan Boston, is now open to controlled boat and bank fishing. The administering agency, Metropolitan District Commission, has done a fine job of accommodating anglers with rentals boats and motors, boat-launching ramps, car parking and access sites, sanitary facilities, etc. The Massachusetts Division of Fisheries and Game has done a very commendable job on its part in managing the fishery. It has created there the only lake trout fishery in the state.

The Division of Fisheries and Game, covering the first ten weeks of 1960 fishing (April 16 to June 24), reported that about 50,000 fishing trips were recorded at the Quabbin in that period. Over 23,000 were boat fishing trips; they averaged 7 hours per trip! Their total catch included 675 lake trout averaging about 4.7 pounds apiece, 2,737 browns and rainbows averaging nearly 2.2 pounds, 865 largemouth and smallmouth bass averaging over 2.1 pounds, and 505 pickerel of nearly 1.5 pounds each. Together with about 30,000 white and yellow perch, bullheads and small sunfishes weighing about 12 tons, their total catch weighed nearly 18 tons.

Lake trout up to 10 pounds apiece, brown trout from 9 to 18¾ pounds, largemouth bass up to 6 pounds, smallmouth bass averaging almost 1¾ pounds, and chain pickerel weighing 4 or 5 pounds were not uncommon in the catch. White perch and bullheads continued to be the most frequently caught pan fishes, with yellow perch as runner up. The larger white perch weighed over 2 pounds; many yellow perch weighed over a pound.

Washtub geese

Highlight of the 1959 goose nesting survey in Washington was the discovery of the high usage of artificial nesting sites by Canada geese along the Okanogan River. Of 101 old washtubs mounted in trees, 52 contained nests.

License tab

Hunters expended more than $57¾ millions for hunting licenses, stamps, tags and permits in the 50 states to legally pursue and take wild game during 1959. This exceeded the expenditure during 1958 by nearly $4¾ millions, according to information compiled by the U. S. Fish and Wildlife Service. There were just under 11¾ million hunters who made these purchases, with 46 states reporting. This is a decline in numbers of 2.2 per cent compared to the same period in 1958.

The total number of licenses sold is not an accurate reflection of the total number of hunters, because some states require sportsmen to purchase separate licenses, stamps, permits and tags for various types of game as well as for special regions or areas.

New York reported 700,010 paid hunting license holders who purchased 1,048,772 of the various licenses and permits, paying a total of $2,632,216 for them. New York was fifth among 50 states in license fees paid. Michigan was number one, followed by Pennsylvania, Wisconsin and California.

Turkey tour

The Aztec Indians of Mexico are reported to have been the first to domesticate the turkey. Spanish explorers then acquired stock from the Indians and took the gobblers to Europe where more progress was made in developing the bird for domestic use. The improved strains became popular throughout Europe and eventually were transported back to the New World by Europeans as our domestic turkey—and we have made many additional improvements and variation in the stock.

Morris W. Brackett

On December 13, 1960, funeral services were held at Holley, Orleans County, for Morris W. Brackett who retired from State service as Chief Game Protector in July, 1937. He was, in fact, the last to hold that title, it having been changed to Superintendent of Law Enforcement at the time of his retirement.

Brackett was first appointed Game Protector, July 1, 1917 at the prevailing salary of $900 per year. He was promoted to Inspector—equivalent to the present day District Game Protector—in July, 1919, and to Chief Game Protector in 1931.

Morris Brackett was born and grew up on a farm at Clarendon, a small country town south of Holley. His passing further thins the ranks of the Department's "oldtimers."

New duck stamp

A hen mallard and her eight ducklings, in their natural habitat, will feature the 1961-62 Federal Duck Stamp. Entitled, "Nine Mallards," this black and white wash drawing by E. A. Morris of Minneapolis, Minnesota was selected from the many submitted for the 28th in the series of migratory bird hunting stamps.

Ducks and bugs

A recent study showed that some 98 per cent of the food of mallard ducklings consists of animal matter, primarily insects. More plant material is consumed as the ducklings grow and when the first feathers appear in the replacement of down the diet is about equally divided between animal and vegetable matter. By the time the ducks are fully feathered, plant material pre dominates in the diet.

Shrimp

Once a rare delicacy practically unknown in the average American home, shrimp has become one of the most common sea foods on our inland markets. Shrimp tails—fresh, cooked or canned—are for sale in almost every grocery store or frozen food counter. In cities and towns and along highways we see dozens of neon signs advertising French Fried Shrimp. This has come about because rich new shrimping grounds have been found where American fishermen with their improved otter trawls can scoop up this "pink gold" on a large scale. And, gold it is, because in 1957 they received $65 million for their catch—more than for salmon, tuna, oysters or any other sea food. In that same year, Chicago wholesale dealers, alone, distributed 15 million pounds of shrimp tails, most of which rolled up from the Texas coast in fast refrigerator trucks.

A favorite pastime along the coasts of our southern states is to catch shrimps at night with casting nets. They jump like grasshoppers and their eyes glint orange by reflected light. Few of us northerners have ever seen a whole shrimp, much less a live one, because commercial fishermen pinch off their heads as they are caught. Actually the "head" of a shrimp is much more than a head. This shell-incased head includes the internal organs, as well as the attachments for the legs, eyes and other forward appendages, and the very long antennae or whiskers. This leaves only the meaty tail and a part of the intestine called the "vein." The shell is very thin and, in life, translucent with faint tinges of blue, green or gray. Only after they have been boiled do they turn "shrimp pink."

The shrimp is a crustacean related to the crayfish, lobster and crab. Like them it has five pairs of legs but, unlike them, the first pair is not an enlarged pincer or heavy claw. In water, they have three means of locomotion: Walking or climbing with the legs, darting backward by flipping the scoop-like tail, or gliding slowly forward by the rhythmic paddling of several pairs of swimmerets under the tail. They feed on dead plant and animal matter.

Adult shrimps of different kinds range in body length from a little over an inch to eight inches or more. Most species live in salt-water or brackish water, but a few kinds live entirely in fresh-water. The females of these latter kinds carry their eggs under the tail as crayfish females do. These hatch into young that look like miniature replicas of the adults.

Infant shrimps of marine species, in contrast, get no parental care and go through a long series of transformations before they are the least bit shrimp-like in appearance. The female of the common edible shrimp releases enormous numbers of microscopic eggs—a half million to a million of them at a time—in the waters of the Gulf. These develop into tiny mite-like larvae that drift at the mercy of ocean currents and suffer enormous losses at every stage. At first they have unsegmented bodies, a single simple eye and three pairs of rudimentary appendages. With each succeeding molt, new appendages are added until there are nineteen pairs in all, the body becomes segmented, and it gets the two compound eyes typical of adult crustaceans. Only a few reach the nursery ground near shore where they grow rapidly. When nearly mature they migrate back to sea and make the final change into full-blown shrimps.

During its development from egg to adult, each one seems to repeat the evolutionary history of its kind—each one climbs its own family tree!—NATURE BULLETIN, *Forest Preserve District, Cook County, Ill.*

Forest recreation

Commercial forests of the United States are providing an ever increasing acreage of land for outdoor recreation. This was determined by a nation-wide survey just completed by American Forest Products Industries. Covering a total of 58,140,936 acres, (86.2 per cent of the 62,382,000 acres of industry-owned commercial forest land in the U. S.) the survey showed that 53,654,702 acres (92.3 per cent of the acreage surveyed) are open to public hunting.

Fishermen can use nearly 40,000 miles of streams on these lands, while other major recreation activities include hiking, swimming, camping, winter sports, organized recreation and berry picking.

The number of annual visits to industry timberlands was estimated to be 6,057,660. Land surveyed is owned by 518 companies across the country, growing trees on a permanent crop basis for manufacture into pulp, paper, lumber, plywood and numerous other wood products.

The welcome which American Forest Products Industries are extending comes at a time when a mounting population is causing great pressure on all recreational resources, private and government, throughout the nation.

A number of the trends are evident in the latest survey and include: (1) Companies are putting in more parks and picnic areas for use without charge to the public; (2) one of every five companies now provides camps and other facilities; (3) fewer companies require permits for use of their lands; (4) more companies are planning additional parks in the future; (5) leasing of campsites is increasing; (6) few companies now charge for hunting, few acres are actually closed to hunting; (7) more land is devoted to game management areas; and (8) more land is open to fishing, more companies offer fishing and there has been a sharp reduction in number of companies charging for fishing.

Editor's note: See "Forest Recreation Research," this issue, for more on this subject.

Rabbit serum

A serum from certain strains of rabbits has been used successfully to treat patients with atropine poisoning. Victims are usually youngsters under four who are poisoned by cold tablets or other adult medications or by plants such as bella donna, herbane and jimson weed. Enzymes in the rabbit serum are believed responsible for its protective effect.

Eating out

Americans spend a billion dollars a month eating out according to the National Restaurant Association and sea foods are one of the big items on the menus.

The red fox

Why does the fox have a bushy tail? Is he really as smart as most people say? Does he get any fun out of life? These are far from earth-shaking questions, but the answers are interesting. Here are a few facts—and a few fancies, too—about a colorful and highly controversial character of the wild, Mr. Reynard, the red fox:

You'll hear the fox called everything from the king of game animals, to a low-down sneaking varment, depending on whether it's a fox-hunter talking, or a farmer who's trying to raise some chickens. Zoologically speaking, the fox is nothing more than a little wild dog. He belongs to the same animal family as collies and beagles, coyotes and wolves. As a rule, the full-grown fox weighs between eight and twelve pounds —little more than a good-sized housecat. Occasionally, one may tip the scales at 15 pounds, but that's unusual.

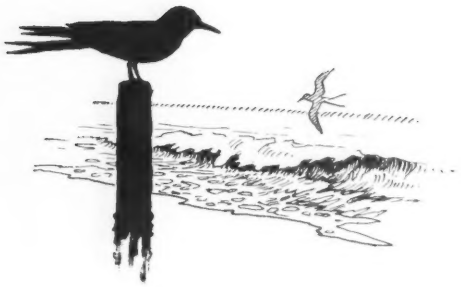
From a distance, the red fox looks as if he's wearing black boots, and his coat seems a plain golden-red color. But if you can get up close enough, you'll see exquisite autumn tints of orange, shading into a reddish brown that looks almost pink in some lights. Mr. Reynard's tail is bushy and tipped with white. In fact, that's how you can tell a red fox from a coyote, in case there's any doubt in your mind. Just look for the white tip on the end of his tail. Besides being decorative, the tail is a mighty handy appendage for the fox to have around. When he's fighting another fox, he uses his tail as a shield. In the winter, it's a blanket. To keep their nose and pads from being frost-bitten, they simply curl up in a ball and wrap the tail around them. The colder the climate where the fox lives, the bigger his tail!

Even though the fox is related to the dog, his bark isn't quite the same. The female, or vixen, has a voice that sounds more like a yapping scream than a bark. The male gives a yelp, that ends on a gargling note. Foxes can also screech, and you haven't lived until you've heard this. Their screech has been described as probably the most sinister and unearthly animal sound in all of North America. Their home is usually a big hole in the ground, that's called an "earth" or a den, and, to show how smart he is, the fox tries to find a hole that's already been dug by some other animal—a woodchuck for instance—then he enlarges and remodels, as necessary.

The pups are born in March or April, with an average of five to a family. And for a week or so after they're born, poor father isn't allowed to set a foot inside the den. Guess we know who wears the pants in the fox family! But he doesn't seem to mind, and goes on with his regular job of bringing home the bacon. Foxes, incidentally, are omnivorous. They'll eat rabbits, mice, rats, moles, woodchucks, squirrels, grasshoppers, fish, fruit, berries, birds, tomatoes, and just about anything else they can get their paws on. To the chagrin of many a farmer, poultry seems to be another favorite dish of Mr. Reynard and his family. Fruit farmers, though, like to have the fox around, to help control the mice.

Even his worst enemies have a lot of respect for the fox and his never-ending ingenuity. Of all our wild animals, he seems the most ready to learn from experience. His ability to escape from captivity is almost phenomenal. His tactics in hunting are incredibly varied, according to the kind of meal he's after. And the way he learns to distinguish the latest devices used by trappers can be downright disconcerting. People still "ride to the hounds" in New York State and the fox is as famous as he ever was for out-running and out-tricking many a smart dog or pack of dogs. In fact, he seems to get a big kick out of fooling the hounds.

Call him a varment or a hero, you'll have to admit he's a handsome guy, with personality plus—one of New York's most colorful animals. — ROSEMARY CLARKE



Letters to the Editor

The black perch

Dear Editor: Having searched sundry reference works to no avail, I am writing you in hope of information on a fish known locally as the black perch. I hear that it greatly resembles the black bass, but can be found only in the spring, frequenting the shoals and stream mouths at that season, when it is caught in great numbers: and that each year on the day the bass season opens it disappears with the punctuality of the Capristrano swallow. I spent most of last summer trying to catch one of these curious fish, all over this end of Lake Ontario, at all depths and bottoms with everything from muskellunge spoons to live spiders, but caught none. I have noticed that the most expert and dedicated black perch fishermen, who tell of catching them by the hundreds in the spring, either quit fishing in the summer or come in empty handed, then muttering that the bass fishing is no good any more; but I think they have become addicted to the black perch, and would no more demean themselves by fishing for bass than would the trout purists. It must be a very fine fish indeed that can acquire devoted followers, and it seems a great shame that it is in such short season and can not be found during the summer fishing. So it seems to me that if the Conservation Department has any knowledge of this fish and of where it goes in the summer, we taxpayers are entitled to know about it.

William Polk, Adams

P. S. If it would be possible for you to put me in touch with that fellow in the November issue who gets forty barrels of cider to the ton of apples, I have a hunch that he might be a black perch fisherman.

• *There has been some delay in replying to your most interesting letter of November 28 in which you reported upon the rather unusual habits of that unique species of eastern Lake Ontario—the black perch,* Perca nigrasootensis. *The delay, we hasten to add, is due to our efforts to locate black perch fishermen in this area whom we might interview, and a search of Department records which we hoped would shed some light on this dark subject.*

We regret that none of the anglers to whom we talked had ever had the good fortune to be "on location" during the spring run of this species, although several said they had been advised by local residents along the eastern Lake Ontario shore that, "they should have been here last week——."

Our search of Department records wasn't much more productive. We did find that Clyde Headtrough, well-known hatchery superintendent of yesteryear and a black perch fisherman of some repute, in his day, is reported (unconfirmed) to have searched diligently for the spawning beds of this species, hoping to capture some of the adults for experimentation with artificial propagation. Unfortunately he apparently found the species most elusive and as difficult to net as to take with hook and line. There is no indication he ever succeeded in his quest. In fact, there's brief mention of Headtrough's retirement some months later, after he had been repeatedly observed walking the shores at midnight, dragging a section of tattered haul seine behind him.

And that about sums it up. There are two or three rather obscure notes indicating that the species was common many years ago in the Black River system; some suggestion, in fact, that one was named for the other, but diligent sampling of the fishery there has failed to turn up a single specimen, attributable perhaps to hydro-electric dams blocking their spawning run.

We want to assure you, however, that the Department will be alert to pursue any possible avenue that offers hope of recouping the black perch fishery of eastern Lake Ontario. Fortified by 40 to 1 cider, we shall press onward.—Editor

Tilapia

Gentlemen: I have read in your issue of June-July, 1960, page 35, an article entitled "Trout to Tilapia" about the fish tilapia.

Can you please tell me the scientific name of the fish "tilapia." so that I can get more information about the species?

S. Kapitzki-Dysarz, Bedford Hills

• *A number of species of tilapia are used in pond culture in tropical areas. Dr. H. S. Swingle, Agricultural Experiment Station, Alabama Polytechnic Institute, Auburn, Alabama, has carried on experimental pond production studies with the Java tilapia* (Tilapia mossambica) *and Nile tilapia* (Tilapia nilotica) *and has reported results in a paper "Comparative Evaluation of Two Tilapias as Pondfishes in Alabama," Transactions of the American Fisheries Society, Vol. 89, Number 2, April, 1960. Tilapia are adapted to a warm climate and tests indicate the Java species ceased feeding at temperatures below 60° F. and died at 48°F. Since they are not suited to our New York climate, we have not carried on any experiments with them. I believe the Alabama study is the most comprehensive information available from work done in this country. —John R. Greeley, Chief Aquatic Biologist*

Early "chain saw"

The picture reproduced above came to light among a miscellany of old letters, papers, etc. in the attic of an abandoned farmhouse in Delaware County. We sent it along to The Farmers' Museum at Cooperstown. Here is what they have to say about it.—Editor

• We have a rig somewhat similar to yours at The Farmers' Museum that looks like the primitive forerunner of the portable chain saws. The difference between our model and the one shown in your illustration is that ours was set up for bucking rather than felling.

Considering the relative awkwardness of setting up rigs like these in the field, the advantage would have been, of course, that the farmer or other lone operator could saw logs of considerable size (or trees) without having to hire an assistant to ride on the other end of the saw. Since the one-man type of felling saw didn't begin to supplant the axe until the 70's, or 80's in many cases, I would guess that the "improved" rig like yours would date from around the turn of the century.

E Guldbeck, Research Associate,
The Farmers' Museum, Cooperstown

Justice

The following exchange of letters between Henry D. Blumberg, Assistant District Attorney, Herkimer County, and Charles J. LaBelle, Counsel for the Conservation Department, describes the successful prosecution of two hoodlums in hunting clothes. Masquerading under the name of sportsmen, they are the kind who undermine the confidence of the public in general and of the landowners in particular in those who go afield to hunt and fish.

We wish to commend the Herkimer County District Attorney's office and the members of the jury in this case for bringing the guilty to such swift justice.—Editor

Counsel,
New York State Conservation Department,
Albany, New York

Re: People on the complaint of Engert v. Raymond Grower & Charles Grower

Dear Sir: The complainant in the above states that on October 25, 1960, in the Town of Ohio, Herkimer County, at about 9:00 a.m. he shot and killed a deer. He then "dressed out" (i.e. removed the entrails) the deer, placed it in a stream, and because he could not carry it himself, went to get help to move it. He failed to find anyone to help him and about two hours after the kill, returned. When he was almost upon the scene, he heard two shots and when he reached the place, the deer was gone. It was, or had been, snowing so that the complainant was able to follow tracks. About 15 minutes after hearing the shots, during which time he was following the tracks, he came upon the defendants with a deer. The defendants told him that the shots he heard were theirs; that they had killed the deer and were in the process of carrying it home on a pole. An argument ensued, the complainant pointing out that (1) the deer was cold, and (2) that from the time of the shots, the defendant had not had time to dress out the deer. The defendants persisted and the complainant caused a warrant to be issued for their arrest charging petit larceny. The trial, to be held November 17th, is causing no small interest in the Town of Ohio.

The matter might well be resolved were I able to run a ballistic test on any shells in the carcass; all parties having used rifles. However, the defendants immediately cut up the deer and it now is in their freezer. So the case resolves itself into which side the jury will believe. The time required to "dress out" a deer, therefore, seems to me to be quite important. The complainant claims to have dressed out some 15 deer, taking not less than 20 minutes in each case. Raymond Grower, R.D., Cold Brook, N.Y. is about 23; Charles, same address, is about 19 so that, legally, they can not have had too many deer. I'd like to know how many. Can you check your records and let me know how many. I know this is quite a job, but I hope you can and will do it. If you are able to find such information, can you put it in affidavit form, under seal, so that it may be offered in evidence.

If you have any suggestions for the prosecution of this case, I would sincerely appreciate them. My mailing address is P. O. Box 109, Little Falls, N.Y.; telephone Little Falls 79. May I hear from you before November 17th?

Henry D. Blumberg,
Assistant District Attorney,
Herkimer County, Herkimer

Re: People on the complaint of Engert v. Raymond Grower & Charles Grower

Dear Mr. Blumberg: In reply to your letter of November 5, I hand you herewith a copy of the pamphlet on Field Dressing a Deer as issued by the Conservation Department. Perhaps this will assist you in formulating questions necessary to establish the time necessary to dress a deer.

In making further inquiry, I find that the Department does not keep a cumulative list or records through the years which record the number of deer taken by any individual. The only requirement appears in Section 234 of the Conservation Law at sub-section 1-a which provides that when a wild deer is taken the taker shall tag the deer with an original tag attached to his license and mail the duplicate thereof to the Department, which shall be done within ten days from the date the deer was taken; that if the tag is not received by the Department within fifteen days of the date the deer was taken, that fact shall be presumptive evidence that the licensee did not forward it as required by the Section. I have asked our Recording Section to keep an eye out for the tag as required herein and if one is not received fifteen days from October 25, I shall so advise you. Since your action is not returnable until the 17th of November, we may be able to provide you with this information on time. Such information perhaps would go to the credibility of the defendants as to whether or not they harvested the deer and certainly by their allegation our Department would be interested in knowing whether or not they have complied with the law.

Further inquiry among our law enforcement agents produces the response that this is a common occurrence in the woods and very difficult to prove unless the deer has been secretively marked by the hunter who then has proven the theft before witnesses.

If I can be of any further assistance to you, I shall be pleased to do so. With kind regards, I remain.

Charles J. LaBelle, Counsel,
N.Y.S. Conservation Department

Re: People on the complaint of Engert v. Raymond Grower & Charles Grower

Dear Mr. Blumberg: Enclosed herewith please find certification of our Supervising District Game Manager attesting to the fact that this Department is not in receipt of the required Deer Report Tag and that search, therefore, has been made, as requested by you.

Charles J. LaBelle, Counsel,
N.Y.S. Conservation Department

STATE OF NEW YORK :
County of Albany : SS.:
City of Albany :

November 17, 1960

TO WHOM IT MAY CONCERN

I, Arthur W. Holweg, being duly sworn, do hereby certify that I am the Supervising District Game Manager in charge of the Game Management Section of the Bureau of Game, Conservation Department of the State of New York; that I have made due and diligent search of the records on file in my Bureau and find that, as of November 17, 1960, a duplicate Deer Report Tag as required by Section 234, sub-section 1-a of the Conservation Law has not been received by this Bureau from either or Raymond Grower and Charles Grower of R. D., Cold Brook, New York.

Arthur W. Holweg

Subscribed and sworn to before me
this 17th day of November, 1960
James W. Kelly
Notary Public State of New York
appointed in Cortland County, Comm.
expires March 31, 1961

Hon. Charles J. LaBelle, Counsel,
Conservation Department,
Albany 1, New York

Re: People on the complaint of Engert v. Raymond Grower and Charles Grower

Dear Sir: I am pleased, and not a little proud, to report to you that a jury of five men and one woman took six minutes to find the above defendants guilty of petit larceny as charged.

In cross examining Charles Grower, who, according to the defendant's testimony, was to be credited with the kill, Charles stated that he had sent the required notice of harvesting a deer to your Department on or about October 27, 1960. Charles was then given your certificate to read and asked if he wished to change his previous answer. He stated that he did not. I do believe that the certificate was a most important factor in the jury's verdict. My sincere thanks for your excellent co-operation.

Henry D. Blumberg,
Assistant District Attorney,
Herkimer County, Herkimer

Boating safety

Gentlemen: Thanks for your good news of improvement in boat safety and congratulations to W. Peer and R. Emperor in their life saving work at Fish Creek last summer, reported on page 35 of your October-November issue.

Formerly devotees of outdoor life at Fish Creek, my family and I have not patronized it for some years, partly because of the former profusion of hot-rod speedboaters and six-year-old outboard motor operators. Both there and at Lake George our canoe has been threatened, purposely or accidentally, and nearly swamped more than once. Now it appears possible for us to resume such leisurely vacationing some day, safely.

To all the brave wardens of our lakes and shores: Your services to water safety and human conservation are deeply appreciated.

Leon D. Nettleton, Pleasantville

Monday opening

Dear Sir: Today was the first day of hunting season for the wily pheasant and the season opened at 10 a. m.

Unfortunately due to my present occupation as a "white collar worker," I was unable to enjoy the first day of hunting, due to conditions beyond my control, even though I own a farm which, incidently, is not posted.

A chat with some of the office staff revealed that there was a lot of comment as to why the season opened on Monday—a normal working day for the greatest majority of people in our area—if not in the State.

Our, or my question is, why can't the season be opened on Saturday, so that persons no matter what their status or positions, might be afforded an equal "first" chance at the wary pheasants?

We all realize the problems in satisfying everyone, but we believe that a Saturday opening would give the greatest percentage of hunters an equal opportunity.

Emory G. Smith, Clifton Springs

• *You, of course, realize that we have a great number of small game hunters in New York State who can and do, at times, cause high hunting pressures in certain areas of the State. Such pressures were common when the opening day was a Saturday, resulting in many complaints from farmer-landowners. This unhappy situation often caused additional posting. Consequently, to reduce pressures and to try and spread out hunting, we have selected a weekday or a Monday for opening day. This may seem a little hard on those who have to work on a Monday and cannot arrange to have the day off. On the other hand, if we satisfy the landowners by doing this, it is one way of helping to guarantee open lands for hunting in the years to come.*

This action of opening our seasons on Monday has been strongly recommended and supported by the Farm Bureau and the Grange. These organizations represent the farmer-landowners of the State and it seems wise to co-operate with their wishes to this extent.

Certainly one of our objectives is to provide as much hunting opportunity as we can. Monday openings may seem to be in conflict with this, but as indicated above, if we look to the future, it probably will result in guaranteeing more hunting opportunity as time goes on.—Albert G. Hall, Chief, Bureau of Game

Tree trouble

Dear Editor: Probably because I have a tree farm and am interested in trees I have seen things in the New York State plantations that I wonder about.

In the Town of Almond on the left side of the Cotton Smith Road off Karr Valley, why did nearly all the white spruce, after they were trimmed, die up about two feet on the south side of the trees? The north side of the trees are O. K.

What is chewing the bark off the Scotch pine 10 to 20 feet above the ground? In some cases the trees are chewed so badly that the tops break off. Could this be porcupines?

Why should Norway spruce in the area have dwarfed foliage? The tree is about 20 feet tall, only the top seems to be normal (the terminal growth).

Harold MacMichael, Almond

• *It is quite likely, judging from the description you have given of the condition of pruned spruce trees growing in the Town of Almond, that they have been affected by sun scald.*

You are correct in assuming that porcupines are responsible for the damage to the Scotch pine. Porcupines are very fond of the smooth bark near the tops of fairly tall Scotch pine.

The very short needles and short twig growth of the Norway spruce specimen indicate that the tree is not getting proper nourishment. It may be that the tree is growing on shallow soil or that the root system has not developed due to improper planting.—William E. Smith, Forest Pest Control Foreman

Mr. Jewell's frogs

Dear Sir: Sometime ago, when you printed the photograph of old Mr. Pliny Jewell feeding mice to his pet frogs, there were so many letters of comment that you had to devote several special pages to them. It was all delightfully interesting, but you missed the most authoritative account—"Autobiography With Letters," by William Lyon Phelps, Oxford University Press 1939, pages 107-108. I just happened to be rereading what "Billy" Phelps had to say about his boyhood in Hartford, Connecticut, and came upon this account which I thought would interest you:

"Some of the happiest hours in my boyhood in Hartford I owe to the late Pliny Jewell, a charming, kindly, old gentleman, who lived in a beautiful house on Farmington Avenue, with extensive and well-kept gardens. On this estate was a pond which froze solid every winter. Mr. Jewell had printed a number of cards inscribed 'Skating Ticket', and he gave one to every boy in the neighborhood he felt would not abuse the privilege. What fun we had on that pond! I used to go over occasionally to the pond, in the summer twilight, to see Mr. Jewell with his frogs. A servant would bring out a large armchair and place it on the border of the little lake. Then the old gentleman came, took his seat deliberately, and began to ring a large dinner bell. As the mellow tones filled the air, the frogs would emerge from the water and group themselves expectantly, yet respectfully, around Mr. Jewell, who fed them with bits of bread, which they received courteously. I had never discriminated among frogs; but to this gentleman every one of those frogs was an individual, and he had named them all. The largest was called Laura Matilda, and was his favorite. I have seen Laura draw near his armchair, take a bit of bread delicately from his fingers, eat it, and then wipe her mouth daintily like the Prioress in Chaucer."

THE CONSERVATIONIST provides me with some of my favorite spare-time reading.
Wilson Fitch Smith, M. D., Hartford, Conn.

• *Reference to "The Unforgetable Picture" Feb.-Mar., 1960, will provide pretty convincing evidence that Pliny's frogs were not on a straight bread diet.—Editor*

Pond restoration

Dear Sir: I have become convinced that rotenone is the only way to reclaim a pond. I want to know how to go about it. Is an expert on rotenone necessary? I mean, could one man (me) poison a 7-acre pond? How much equipment is involved? How much cost? How long after rotenone is put in the pond will the pond be ready to stock with trout? The pond I have in mind is very deep and its fish are perch, bass and stunted bullheads. The fish are small and the pond is not fished much. Does this indicate poor food supply? The pond is spring fed and looks like there is plenty of food. The water is a brownish color. I expect the rotenone will not kill the bullheads, will it?

John Meagher, Lake View

P. S. I am interested only in trout. I don't hunt and I don't fish for any other fish. I hope this pond I have in mind will produce good trout. Why does the Department usually restrict fishing with dead minnows in a trout pond? Also no swimming? I can't see the harm in it.

• *I am enclosing the Information Leaflet entitled, "Use of Rotenone for Reclamation of Fish Ponds" which I believe will answer most of your general questions concerning the possible treatment of your 7-acre fish pond. You will note that a permit for the use of fish toxicants is required. Application should be made to Dr. U. B. Stone, District Fisheries Manager, New York State Conservation Department, 2130 Scottsville Road, Scottsville, New York, if your pond is located in Erie County.*

Specifically, I would say that one man could treat a 7-acre pond using hand pumps. The cost of emulsifiable rotenone is approximately $5 a gallon. The leaflet explains how to calculate amount to use. Without having more detailed knowledge of the pond, it is difficult to say whether the stunting of the present fish population is due to a poor food supply. Based upon the past history of many waters, stunting is probably due to competition for the available food supply, which should prove adequate for brook trout. It is possible, but not certain, the bullheads can be eliminated by use of rotenone.

The reason that the use of fish as bait, either dead or alive, is prohibited in reclaimed and other natural trout waters is to prevent the introduction or reintroduction of undesirable species of fish into these trout waters. The dumping of bait buckets in trout waters is believed to be a prime source of introducing undesirable fish. I am not familiar with any restrictions prohibiting swimming in trout ponds unless they may be water supply reservoirs subject to special regulations.—Robert G. Zilliox, District Fisheries Manager, Adirondack Fisheries District

Well done

Dear Governor Rockefeller: I am writing this to express my appreciation for the fine work done by the State Police and by the Conservation Department in the search for the B-52 crew members who parachuted into the Schroon Lake area on the night of 9 December.

As you will recall, this aircraft was on a routine training flight out of Westover Air Force Base, Massachusetts and at the time of the incident was making a penetration turn in the vicinity of Crown Point preparatory to making a low altitude practice bombing run on Watertown. Although it will be some time yet before the investigation into the cause of this tragedy is complete, preliminary conclusions indicate that the crew believed the aircraft to have failed structurally and that a crash was imminent, causing them to execute their emergency escape procedures.

Plattsburgh Air Force Base being the nearest to the scene has conducted the search with the support of the members of the State Police and the Conservation Department as well as other individuals. I want you to know how much we have been impressed with the fine spirit in which these men supported our efforts to recover the downed crewmen. The State Police, under the leadership of Sgt. G. W. Hanby, maintained constant contact with our Command Post at Bensen's Motel at North Hudson, patrolling all of the highways and secondary roads in the area, directing traffic, relaying information and providing transportation and assistance in many other ways too numerous to mention. It was a pleasure to me to have an opportunity to work with Troop B, Malone and to see the fine spirit and devotion to duty displayed by these men. In the three days that I spent in charge of the Command Post at Bensen's, these men rendered invaluable service. I hope you will pass on to them a large vote of thanks for the United States Air Force. They are: Sgt. G. W. Hanby, Sgt. E. A. Dienst, Cpl. C. W. Straight, Tpr. K. E. Goodspeed, Tpr. B. E. Stiles, Tpr. R. H. Lavigne, Tpr. W. J. Lemza, Tpr. K. F. Armstrong, Tpr. R. H. Garrand, Tpr. D. K. O'Halloran, Tpr. L. A. Stoffell.

The section of the county into which seven of the crew members parachuted is about as wild as any I have ever seen. Nevertheless, the men of the Conservation Department led sortie after sortie on foot into this territory in sub-zero weather with the ground covered by snow in an attempt to locate the eighth and last crewman. In addition, they have flown many sorties with us in the helicopters to act as observers in the search from the air. Their knowledge of that rugged terrain and their willingness to penetrate its remotest regions has earned the admiration of all of us who were privileged to be associated with them in this effort. I hope that you will also pass on the thanks of the Air Force to these men:

Forest Rangers—John Hickey, Keene; Richard Olcott, Elizabethtown; Howard Lashway, Schroon Lake; Richard Thompson, Keeseville; Ernest Hanmer, Blue Ridge; Alex Stowell, Chilson; Chester Rafferty, Chilson; Case Phinney, Moriah Center.

Game Protectors—Paul F. French, Elizabethtown; Walter Bedell, Port Henry; Luther E. Jenks, Schroon Lake; Dwinal G. Kerst, Ray Brook; Donald Sullivan, Olmstedville; Howard White (Special), Crown Point.

Again let me thank you for the fine support rendered by the men of these two organizations and express the hope that if an occasion arises in the near future in which we can be of assistance to you that you will call on us here at Plattsburgh Air Force Base.

John B. Holst,
Colonel, USAF, Commander,
380th Combat Support Group (SAC)
Plattsburgh Air Force Base

Three-legged bear

Editor: This blackie was shot last week in Sullivan County, near the Indian Fields Club by Doug Stickles of Walden.

When the critter was examined, it was found to have only three legs; the haunch was completely furred over and it was thought to have been born shy one leg. In the dressing, however, it was found that the bone had been broken off at sometime, probably in early cubhood.

The bear was fat and weighed at 180, hog dressed.

The deer season has closed and I am of the opinion that the total take is going to be below that of last year. Certainly so in this part of the county.

William Upright, Highland

More on the blue frog

Dear Sir: I read with great interest the note in the last CONSERVATIONIST on the blue frog. I have in my office at the present time a male *Rana clamitans* blue frog. I have checked with Professor A. H. Wright, author among other things of "The Handbook of Frogs and Toads." He has seen only two or three blue frogs during a lifetime of work on amphibians.

I would be extremely grateful to any of your readers who might know of the whereabouts of another blue frog. I am anxious to experiment and try to find the cause of the blue coloration. I would particularly like to contact Miss Sandra Eggleston, whose letter about the blue frog you published, but do not have her correct address. Any information should be sent to Dr. Lowell D. Uhler, Professor of Biology, Robert Hall, Cornell University, Ithaca.

Lowell D. Uhler

Arrowheads

Dear Editor: I have recently acquired a number of Indian arrowheads which came from either Michigan or upper New York State, around the Fulton area.

Would you please tell me how I might be able to determine their origin and for what purpose the various sizes and shapes were used?

While I'm on the subject, do you know of any authoritative books on the life of the Indians of New York State as opposed to adventure stories about the Indians?

Thank you very much for your kind consideration.

Donald C. Fish,
Ann Arbor, Michigan

• *It would be difficult to determine the origin and purpose of New York State Indian projectile points by anyone but an expert at the present time. However, Dr. William A. Ritchie, of the staff of the New York State Museum and Science Service, has written a bulletin identifying them by type and material. This bulletin is now in press and would prove to be useful for your purpose, when published.—Charles E. Gillette, Associate Curator of Archeology*

Varment hours

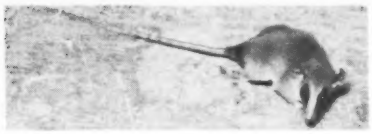
Dear Sir: I love hunting so much that I hunt all year 'round. When I can't hunt protected game I go after varments. However, I have a problem that I want you to clear up for me. Does the shooting hours of 7 a.m. to 5 p.m. apply to varments as well as to protected game? Especially when you are hunting them on private property with the consent of the owner who wants to get rid of them?

I would appreciate your answer very much.

S. L. Patrickakos, Brooklyn

• *Hunting hours, as set forth in the Conservation law, have reference to protected species of game, during their open seasons —not to varment hunting.—R. J. Vickers, Assistant Superintendent, Law Enforcement*

Mouse opossum



Dear Sirs: I am enclosing herewith a picture of a small rat-like animal that our people found recently in a bunch of bananas shipped in from South America. Can you tell us what it is?

He was rather vicious when we had him; probably with good reason, for I understand that the bunch of bananas in which he was found was dunked into a vat of detergent before it left South America and then when it arrived here, it was subjected to 24-48 hours in a gas chamber to ripen the fruit. How he ever survived, I wonder.

While with us, he didn't seem to be hungry but he had a terrible thirst.

C. D. Wagoner, Editor,
Grand Union Empire, *Division Progress*
Waterford

• *The picture clipping from* Grand Union Empire Division Progress *shows a murine opossum, better known as a mouse opossum. About the size of a rat, slenderer, with much longer tail. They frequently arrive in this country on "hands" of bananas, hence are sometimes called "Banana Stowaways." There are several species, but this photo shows the intense black eye rings, so suspect it is* Marmosa mexicana. *Most likely the bananas came from north of Panama, rather than South America, probably Guatemala.—W. J. Hamilton, Jr., Professor of Zoology, Cornell University*

Skyscraper plants

Dear Sir: I am doing a graduate study with the State University at New Paltz on how the strength of the stalk of a plant can be applied to man's structures.

It has been recommended that I check with THE CONSERVATIONIST on information concerning this topic. Any studies that may have been done in this area would be of value, particularly on the corn stalk.

Raul France states in his biotechnical studies that a skyscraper, if the same structural principles would be employed in its construction as they appear in the stalk of a plant, could be 700 stories high with the same material as used at present.

Any known statements to support such a statement would be very beneficial.

Philip Savino, Deer Park

• *I think we would have to say that structural engineers are already making use of the principles that make the stalk of a plant so strong for its weight. The stalks of many plants, including corn, are hollow or have only a lightweight filler inside; hollow or box-shaped columns and girders are widely used in structural design. The structural sandwich also uses thin, dense facings with a lightweight core for maximum strength and stiffness with light weight.*

The nodes that occur at intervals in the stalks of corn and many other plants give lateral bracing that helps to keep the thin walls from buckling or crumpling. Lateral bracing of long slender columns at suitable intervals is a well-known structural practice. The stalk (including the trunks of trees) is usually tapered with its greatest size and strength at the bottom where the stresses are greatest; this is sometimes done also with structural columns.

The stems of most plants, including trees, are made up of fibrous materials, with most of the fibers oriented in the lengthwise direction. While this is not true of all structural materials, it is true of wood beams or columns, making them very efficient structural members for their weight. Further, the fibers themselves are generally tiny hollow columns, giving strength with light weight to the whole stem.

We are impressed by the structural efficiency of these long slender columns that make up the stalks of plants and trunks of trees. They must carry heavy top loads while resisting strong lateral forces as from wind. Nature has designed them admirably for the purpose. We have studied possible shapes for built-up poles to carry transmission lines and have found nothing that surpasses the shape and the qualities of the natural wood pole made from the trunk of a tree. Man does well to copy nature here.—W. G. Youngquist, Acting Director, U. S. Dept. Agriculture, Forest Products Laboratory, Madison, Wisconsin

'Chucks and beans

Dear Editor: In the Oct.-Nov. issue of THE CONSERVATIONIST, in the Letters to the Editor section, I read of Mrs. David Bell, her husband *and* the woodchuck with his head in a bean can.

Enclosed is a picture of a woodchuck, taken this summer at the Norm Evans farm of Georgetown. As you can see, it wasn't just beans, but Campbell's beans. The similarity was so great regards the photo and the can that I couldn't resist sending it along to you.

George R. Salbert, Syracuse

P. S. The woodchuck, by the way, was liberated from the can but his health was not helped by the near-suffocation.

• *Woodchuck trappers, if any, should note that canned beans make a most effective bait.—Editor*

Tan bark days

Dear Editor: I very much enjoyed your article on tanning leather, October-November CONSERVATIONIST, by Mr. Hope. I spent several years working at the bark end of this process and would like to say a few things that may be of interest.

Fresh-peeled bark was always left to dry with the "raw" side up. However, as soon as sap was dried (this required only a few days of good drying) the bark was stacked with care to shed out the water, rain or snow, with the *outside* of bark placed *upward*. Bark not well cured commanded a docked price.

The year of 1917, my father, myself and teams delivered to the tannery, operating in Monticello, over 250 tons of bark, grading No. 1. In the years of 1918 and '19, we hauled about 300 tons to the same tannery. This bark was hauled from the "Big Bend" of the Neversink River, and about 40 tons from the Pepacton Hollow near Grahamsville.

The tannery at Monticello closed its scales and stopped receiving bark in June, 1920. Before this date, they used red oak bark at the same price as hemlock, and if my memory is correct, the price was at that time $7.50 per ton. John Knight, now living at Grahamsville, cut and peeled, dryed and piled a lot of bark and remembers the operation or procedure very well.

The raw hides were hauled to the Arthur Palen Tannery from Newburgh. This tannery was located on upper section of "The Neversink Flats." This section of land was purchased by a Reverend Williams and a large summer house was erected to care for fishermen and their families from New York City.

Steven Van Benscoten had the contract to haul the raw hides to Palen Tannery and return the leather to the dock at Newburgh for a term of 18 years.

A plank road ran from the Palen Tannery to the Hudson River at Newburgh—distance 50 miles.

Paul Denman, Grahamsville

Delaware deer

Dear Sir: I have recently read in a publication that the N. Y. State Department of Fish and Game first declared an open season for deer hunting in Delaware County about 1908, and that for some years thereafter each hunter was allowed to take two (2) buck deer per season.

Can you tell me when the law was changed to one (1) buck per season per hunter?

Guy E. Wood, Oneonta

• *Reviewing the record, or history of deer seasons in New York, we find that in several of the Catskill counties there was a "two deer" season from 1900 through 1918. However, Delaware County was not among the counties in that area where such a season was in force. It appears that it was not until 1920 that Delaware County was open to deer hunting, and this followed the 1919 law that limited the take to one buck deer per hunter; said buck having antlers at least three inches long.—Albert G. Hall, Chief, Bureau of Game*

Adirondacks wilderness

Dear Sir: I suppose you'll receive many letters such as mine, but I must write although I fear it will do little good. I see in the Oct.-Nov. CONSERVATIONIST where you plan on making campsites in certain wilderness areas of the Adirondacks. You realize of course that once you do that you no longer have a wilderness area.

I've walked into Big Otter Lake, Pine Lake and many others in the past years and I still do to hunt or fish. I realize some people have doodle bugs, some use 'planes, and some walk like I do. But I don't mind walking. I've walked further for lots less and I figure if it's worth having, it's worth going after. Anything too easy isn't worth having. Once a road is put into any of these places, it's ruined. You should know that. Anyone is free to go into any of these places anytime. Why change it? If you want to do some good, forbid doodle bugs, 'planes or what have you. I'm sure laws can be made to handle that situation.

I very seldom write letters, but I suppose if enough of us did, it would do some good. If people want to swim, they sure don't have to go in the woods that far. If they want to study nature, that can be done anywhere, and if he's a true outdoors man, he can walk in like I and my family have done many a time.

I'm afraid I don't quite understand your reasoning. Maybe you can enlighten me. Believe me when I say I really hate to see this happen. It's times like this that I really wished I had something to say. I care very little about what else goes on in this world. But when you people start to build roads and campsites in these places, I do a slow burn. Here's hoping your plan falls through.

Matthew J. Carpenter Jr., Oakland,N. J.

• I shall send your letter to Assemblyman Pomeroy who wrote the article. It is possible that he will have an opportunity to add to my few remarks. In the interim, however, I want to reassure you that with respect to the developments of public campsite areas, roads, etc. in the wilderness areas as proposed by Mr. Pomeroy's Joint Legislative Committee on Natural Resources, neither that Committee nor the Department contemplates such action. On the contrary the emphasis is all in the other direction—to preserve the true wilderness character of such areas within our Forest Preserve. I think that if you will re-examine the article you will find that Mr. Pomeroy makes it quite clear that his Committee is dedicated to the preservation of these wilderness values and that it is their and our concern with the modern day encroachments upon these values and tracts that motivate the Committee's recommendation for more stringent regulations governing such areas.—Editor

• I can only reiterate that the intent of the Committee is to give as much protection as possible to the wilderness areas in order to preserve their wilderness values. It is only in the areas which, by nature of their present condition have lost their wilderness aspects, that "concentrated forms" of recreation are contemplated.—R. Watson Pomeroy, Chairman, Joint Legislative Committee on Natural Resources

Wilderness areas

To the Editor: More recreational facilities are needed on the Adirondack Forest Preserve lands, but good planning is essential to retain the character of the Preserve in keeping with the spirit of the constitutional amendment. That is why the article, "Wilderness in the Forest Preserve," was a disappointment to me in that it had nothing to say specifically about what recreational facilities are planned and where they would be located. The Committee has selected eleven areas which it feels should be preserved as "wilderness areas." It is common knowledge that these areas constitute true wilderness *already*. The Committee feels these should be set up and provided for first before it continues its long-range planning for other portions of the Preserve. Most people will want to know about the comprehensive plan before committing themselves to a first phase. It could not have taken the Committee two years to select eleven wilderness areas of 10,000 acres or more. Surely its plans must have progressed to the point where it could release to the public more than it has. I, for one, would like to learn more about the zoning it must have in mind.

It appears that the Committee has overlooked the canoe campers. Not one of the eleven areas is canoe country. The popular Old Forge to Saranac Lake canoe route, which is not wild country except for a few scattered spots, is further threatened in my opinion by "concentrated recreation areas" that might be located along these waters because of their proximity to existing highways. I believe it would be a mistake, for example, to construct more public campsites (and more are needed) in the one "wild" area ideal for canoeing and canoe camping: namely, the cluster of ponds north and west of Fish Creek Pond. Weller Pond and Middle and Lower Saranac lakes represent another area which should not be spoiled with public campsites and motorboats; yet any public land not bearing the Committee's wilderness classification must be considered as possible locations for concentrated recreation.

It is noteworthy that the lands included within the eleven wilderness areas are 95 per cent State-owned, indicating that the Committee, in planning a master program for recreation, is severely handicapped by restricting their efforts to a patchwork pattern of State-owned lands. It has not selected a wilderness canoeing area because no suitable one is now owned by the State.

In my opinion all lands now publicly-owned within the Blue Line should be left untouched and new lands acquired for development of additional recreation sites. This premise gives the Committee far greater latitude in planning adequately for all types of recreation, and it will reduce the controversy that is bound to come should present holdings be "zoned" out of the forever wild category.

Will the Committee release more of its complete program?

Donald G. Ross, Jr., Katonah

• Your letter to THE CONSERVATIONIST has been forwarded to me for comment. The Committee appreciates and welcomes expression of opinion from interested people in its efforts for it is only by such expressions that we can formulate the best plan possible.

To answer the last part of your letter first, much of the presently State-owned land is not, in fact, wilderness and much that is now wilderness needs to have more land, now privately-owned, added to it to protect its wilderness characteristics. The State is necessarily limited in the amount of money it can spend for land in the Adirondacks and Catskills. With 2½ million acres at present in these Parks, it seems to me to be preferable to make a comprehensive plan for all the State land rather than for just that which will be acquired in the future.

The study which the Committee has made during the last two years has included a physical inspection of the boundaries and much of the interiors of the proposed wilderness areas. This actual physical inspection was no mean accomplishment. The information on physical characteristics of the areas, the legal status concerning some of it and the use being made of it which has been gathered is essential for good long-range planning. For instance, in the matter of motorized transportation into these proposed areas, before presently used roads or trails can be blocked off, it must first be determined where they exist and whether or not they are public rights-of-way. If the latter is so, legislation may be needed.

I am glad you mentioned the canoe camper. I took a four-day trip from Long Lake to Lower Saranac last summer and am bothered, also, by the threats, particularly from motorboats, to canoe routes. With so much of the land along the ways in private ownership, this matter will need very careful exploration.

The members of our Committee do not believe that an entire plan can or should be presented before the first step is agreed upon. —R. Watson Pomeroy, Chairman, Joint Legislative Committee on Natural Resources

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Hickory graft

Dear Sir: With reference to the picture and letter concerning "natural graft" in the August-September CONSERVATIONIST, I am enclosing a picture of a similar phenomenon involving two hickory trees. These trees are located on the front lawn of a home on Oceanview Avenue, Oakdale Station, N. Y.

Lavern Wittlock, Bayport

Delaware beavers

Dear Editor: Man, it seems, is not the only one who has plans for the impoundment of the Delaware River. A few miles above Hancock, some eager beavers have already constructed one impoundment, complete with canal, and are now busy on another one.

It is too bad that the Corps of U. S. Army Engineers can't find room on their payroll for these creatures.

James R. Westman,
Chairman of Department,
Dept. Wildlife Conservation,
Rutgers University

P. S. I should have obtained a picture of the notching of the logs before cutting into pieces. Does a specialist do this?

• *The pictures show clearly that beaver know their trees—popple, yes; ironwood, NO!—Editor*

Indian blowguns

Dear Editor: THE CONSERVATIONIST for December-January carried a story about Seneca blowguns, illustrated in part by a picture of my blowgun and me and of a museum dummy—the one on the right is the dummy. As Caesar said to Brutus, "that was the most unkindest cut of all."

I have been interested in blowguns since my days at Cornell, when I was one of the informal students of the late "Uncle" Louis Fuertes, the great bird artist. "Uncle" Louis had recently been to Venezuela and had brought home not only a collection of blowguns and darts—poisoned and plain—but also a keen interest in their potential as hunting weapons. His group did quite a bit of experimenting, both in the use of the blowgun and in making of guns and projectiles.

The Seneca blowgun on display at the State Museum and illustrated in your article, may be Indian-made, but it was made with white man's steel tools. They are made by cutting ½" half-round grooves into slats of hardwood lumber, then glueing the two pieces together to make a tube, and planing down the outside to make it round. Such guns stay straight and true, but tend to be heavy. The darts are made from slivers of hardwood, about ⅛" in diameter and 18" long, as illustrated. They are "feathered" with thistledown, wrapped on with silk thread.

So far as I can learn, the only eastern Indians to use the blowgun as a part of their original culture were the Cherokees—and my gun is a real Cherokee blowgun, procured for me by my brother-in-law, E. S. Haswell, of the Department of Mental Hygiene. When he was working in the vicinity of Bryson City, in western North Carolina, he got it from a Cherokee who was the local blowgun champion. It is made from a stem of the cane (*Arundinaria*), which is a common plant in the South, both in the Mississippi drainage and along the Coastal Plain. It is 7 feet, 8 inches long and made up of eight internodes and a short section of the ninth. The caliber at the breech is .55, at the muzzle .49—which represents the natural taber of the cane. Undoubtedly, this one was bored out with a steel tool. The primitive way was to bore them with a little sand, a little water and a stick, plus incredible patience. To keep them straight when not in use, a plug was stuck into the muzzle and the blowgun hung under the eaves of the cabin, outdoors, so that it did not dry out and split.

Darts are useful against small animals. Clay marbles that fit the blowgun fairly snugly are used against birds, the shock being more effective than the stab of a dart. Recently, I was discussing this with our State Archaeologist, Dr. W. A. Ritchie, and he wondered if this might not be the explanation for the otherwise unexplained clay marbles that are sometimes found on New York Indian sites of post-Columbian date. Another blowgun projectile is made from a steel knitting needle, feathered.

Blowgun darts surely "will fly to a distance of fifty yards" and that surely takes a "smart puff." Straight up, they would go perhaps a hundred feet.

At ten paces, I can put a blunt wooden dart through the side of a cardboard carton, up to the "feathers"; knitting needle will go through a piece of roofing slate. Clay balls do not penetrate, but do deliver quite a wallop.

Weld's story that he had "never known them (the Senecas) to miss" is hard to believe, even on gray squirrels during a population explosion, when they are relatively unwary, and at close range. Methinks Weld kissed the Blarney Stone before leaving home.

David B. Cook,
Senior Forester,
N.Y.S. Conservation Department

Apple pomace

Dear Sirs: With respect to your article in the October-November issue of THE CONSERVATIONIST concerning apple cider, you say the pomace would make an excellent supplementary cow feed but not too many farmers know of its merits.

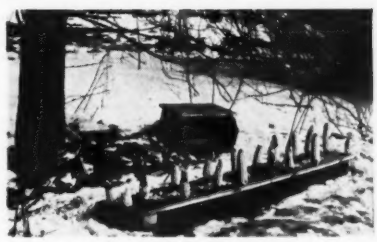
It is correct that under certain circumstances apple pomace is a good feed, but the use of it in connection with the feeding of dairy cows has been pretty much discontinued in this State and in other regions because of the possibility of the cows ingesting spray residues, particularly DDT. When this occurs, there is a very good likelihood that the milk produced by such cows will contain DDT residue. There is a zero tolerance on all pesticide residues in milk as far as the Federal Food and Drug Administration is concerned and we would consider that milk containing pesticide residues is adulterated.

For the feeding of beef cows this is not as important a factor because first, it might be possible that the beef would not be marketed for a considerable length of time after the feeding of the apple pomace, and furthermore, there is some tolerance of DDT residues in meat.

Unless such pomace is known to be free from pesticide and other spray residues it would not be advisable for farmers to use this as a feed for dairy cows or even as a feed for dairy heifers and dry cows which are about to freshen. There is some indication that the DDT remains in the cow's system for several months and will show up in the milk for some time after the feed is consumed.

If apple pomace is to be fed, the farmer should be sure that it is free from pesticide.

L. L. Clough, Asst. Director,
N. Y. S. Dept. Agriculture and Markets



Pheasant feeder

Dear Sirs: Enclosed you will find a picture of the method we at the U. S. Hoffman Machinery Corp. use to feed the pheasants on our property. We found this feeder much more suitable than tying cobs to tree branches. The cobs are held more rigidly and make it easier for the birds to pick the corn. We also furnished them with a grit feeder, "lean-to." This has three sides and is covered for protection from the snow. We started with the first snowfall and I am pleased to say our flock has greatly increased in numbers. There seems to be a shortage of cock birds. Through our field glasses we have never seen more than two cocks in the usual flock of 25 or 30 birds at any time.

John R. Lane, Sr., Syracuse

Guilty!

Airplane pilots will tell you that despite marvelous electronic navigational and flight aids, "gremlins" still ride the air lanes—sometimes with tragic consequences. Leprechauns are on hand, too, to throw special little monkey wrenches in various of the affairs of Man.

Nor are editors neglected! On the contrary, we're sure there's a special band of fiends that survive on hot lead and printers' ink and make their home in photo-engraver cameras. They earn special commendation by turning images wrong side up, throwing dirt on plates, wrenching pictures out of focus and concealing typographical errors until too late for correction.

We had a detachment of these imps looking over our shoulder when the October-November CONSERVATIONIST *was in preparation and they got in a couple of dandy licks, specializing, this time, in decimal points and zeros. Their first triumph was a brief Back of the Book item headed "Parts per million" in which we passed along to our not so credulous readers several arithmetical errors cooked up by a publication called the "NAC News and Pesticide Review." On this one, the fiend in charge of placing decimal points incorrectly was on duty, as you will see by reading Remsen T. Schenck's letter, following. Mr. Schenck was only one of several who were kind enough to write to us on the subject of decimal points.*

Next we come to the "extra zero fiend," first cousin to the decimal point fiend. He got to us in the apple cider department. Nick Drahos, who wrote the article on apple cider is quite aware, as is the editor, that the juiciest of New York apples will not produce 30 to 40 barrels of cider per ton —yet that's what the picture caption said—instead of the correct ratio of 3 to 4 barrels per ton. Fortunately, we have some sharp-eyed, country-bred readers who set us and the "zero fiend" straight on that one—one of the several being A. W. Allison, whose letter also appears below.—Editor

Dear Sir: In reprinting from the "Nac News and Pesticide Review" (THE CONSERVATIONIST, Oct.-Nov., 1960, p. 38) the note on examples of "one part per million," you have perpetuated some sloppy arithmetic.

For instance, the most elementary mental check will show that a million pennies comes to $10,000, not $100,000 (on the justifiable assumption that it is U.S., not European millions, intended. However, $100,000 is wrong in either case).

Similarly, a million inches is 15.8 miles, not 158. A million sheets of cellophane, each .001" thick (by actual micrometric measurement), comes to 1,000 inches or 83 feet, which misses the 555+ feet of the Washington monument by a good deal. There are approximately 560 drops of water in an ounce, and 128 ounces in a gallon: therefore 71,680 drops per gallon and 13.9 gallons per million drops, not 160.

A million crystals of granulated sugar comes to about 1.7 pounds (checked by weighing a representative sample). This is the only one of the five calculations that is even fairly close, being off by only a factor of three. You must use old-style coarse granulated to do it, though, the presently much more common "fine granulated" runs less than half a pound per million crystals.

One ppm is truly a small proportion. They didn't need to exaggerate it.

Seriously, we derive a good deal of enjoyment from the CONSERVATIONIST, particularly the zoological and botanical articles and the correspondence. It is by far the best journal of its class; you are to be congratulated on so successfully keeping it out of the "game news" category.

Remsen T. Schenck, Bangor, Pa.

Gentlemen: Either author Nick Drahos or the caption writer and/or ye editors are city slickers who wouldn't know a ton of apples or a barrel of cider if they fell on them or the cider producers have been able to do what the scientists have failed to do, reverse the atomic bomb reaction and convert energy directly into matter. Since I believe as gospel everything I read in THE CONSERVATIONIST, I lean toward the latter explanation.

Let's see. We started out with 1 ton or 2,000 lbs. of apples and we ended up with 30 to 40 barrels of cider. A barrel holds 31½ gallons and, assuming cider weighs the same as water or 8.355 lbs. per gallon, the cider in one barrel should weigh 263 lbs. So from our original 2,000 lbs. we end up with from 7,890 lbs. to 10,520 lbs. of cider plus the pomace, a net gain of considerably more than from 5,890 lbs. to 8,520 lbs.

It is obvious that a part of the tremendous amount of energy applied to press the juice from the apples is converted directly into matter in the form of cider.

On second thought, I've bought so-called cider in the city, 30 to 40 barrels of which could easily have been made from one ton of apples. Perhaps the caption was intended to read, "One ton of apples plus one good well produces 30 to 40 barrels of commercial cider."

Yours for good old-fashioned York State cider to which there is no equal.

A. W. Allison, Terrace Park, Ohio

First license

Sirs: Could you please tell me the first year that a small game license was required in the State of New York? I think it was 1907 or 1908, but my memory isn't as good as it once was.

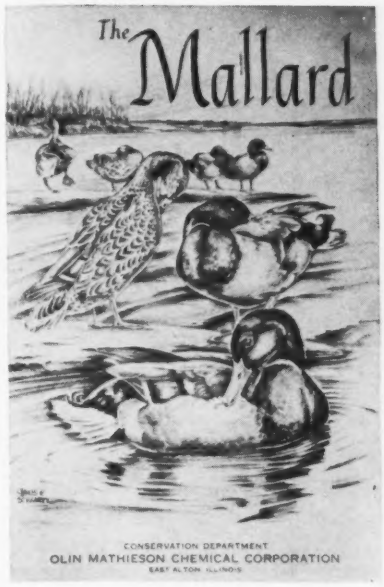
I am 68 years old and I have hunted every fall here in the County of Cattaraugus since the licenses were first required. I can remember being mighty proud of that first round, metal button on my cap.

These new fangled tags for your back are better than no identification at all but give me the good old button. Do you think we will ever go back to them?

Edwin H. Watkins, Franklinville

• *Your recollection is remarkable! The first year hunting licenses were issued was 1908. According to "Fifty Years of Conservation in New York State 1885-1935," the 1908 license covered only hunting. In 1912, a combination hunting and trapping license was issued and in 1915 a button was required. Ten years later, in 1925, a combination hunting, fishing and trapping license was issued. The year 1940 brought about separate licenses for each activity.*

Buttons became a thing of the past during the World War II years when materials were in short supply. The back tag was adopted to replace the button, a very inadequate identification due to size, the back tag affording a much more effective system. New York's landowners, to whom the hunter owes a great obligation for hunting privileges extended, is much pleased with our current back tag.—Shirley Parker, Game Management



"The Mallard"

Dear Editor: "The Mallard" is our Conservation Department's second booklet in an annual series of profiles on our most important American game birds and mammals.

A limited supply of "The Mallard" is available. Single copies will be sent free of charge on an individual request basis as long as the supply lasts.

John Madson, Chief, Information Service, Conservation Department, Olin Mathieson Chemical Corporation, East Alton, Illinois

• *A fine bulletin, well worth reading.—Editor*

Credits

First cover, second cover, pages 6, 15, 21, 24, 25, H. Wayne Trimm; 3, 4, James M. Campbell; 5, 16, 17, Nick Drahos; 7, 9, Dave Allen; 8, *N. Y. Fish and Game Journal;* 10, International Paper Co.; 11, Drahos, International Paper Co.; 13, 14, John E. Harney; 18, D. M. Payne; 19, Payne, Roy Irving; 20, Irving, Payne; 23, Irving; 27, Trimm, Hubert D. Burke; 28, 29, U. S. Forest Service; 31, 33, Soil Conservation Service; 32, S. C. S., *Chenango Union*; 35, College of Forestry; 36, Drahos, Wm. Sussdorf; 38, U. S. Fish and Wildlife Service; 39, Clayt Seagears; third cover, Fred Chambers; fourth cover, Louis A. Fuertes.

The Inside On The Outdoor Series

—A Review

BACK in 1946, when this magazine was born, one page of the very first issue featured several pen and ink sketches of, among other items, the oldest mountains in the world—the Adirondacks—also portraits of a trout, a raccoon and a panther, with notes on how these creatures behave "around the house" when they think no one is looking. The artist-author of all this was Clayt Seagears.

Fifteen years have rolled around since then, each issue adding another chapter to "The Inside on the Outdoors"—the like of which you will not find anywhere in the natural history-conservation field of illustrated writing. Reason: It's difficult to duplicate the ingredients—curiosity about all living things, a keen eye for observing and a patient one, a knack for seeing the unusual, accurate reporting and a flair for writing with a smile. These are the reasons why that first feature page grew quickly into a series and became an institution.

Now we're at the end of an era. Clayt Seagears is retiring (see editorial, page 1, this issue). But before we close the book on "The Inside on the Outdoors Series," let's wander through a few back issues, recapture a little of the Seagears' touch; stuff selected pretty much at random, as were his cover drawings in the accompanying picture.

Seagears on the subject of the red fox is a place good to start, for, as you will see, here is an animal he likes and admires. . . . "One fine February day an old flea-bitten dog fox sat on his furry pants at the edge of a snow-splotched field. He was tired. It was February—the Woo-Moon of the fox—and he had been out chasing a flirty little eight-pound red-head named Vera who preferred another fellow and who was very fast on her feet.

"Dawn has begun to yellow stuff up a little and it was time to go to bed. But he didn't. For a new smell reached his nose which is one of the most sensitive in the whole olfactory business. This smell was a concoction of muskrat and fox glands, tincture of valerian, sweet fennel, perch oil, a teenty-weenty bit of Tonquin musk and a dash of lavender salts. So being a sucker for spectacular smells, like all foxes, he trotted up the hill straight to its source. And there he also could detect a trace of iron and a tinge of human and a taint of old meat buried under a skim of snow and dirt. So he knew immediately that somebody had made what trappers call a dirt hole set. It was made clumsily with avoidable telltale smells and with too much dirt under the trap's pan.

"So this fox struck out one paw very gingerly and scraped a little dirt away—and then some more and pretty soon he dug up the trap and pulled out a bit of chain that had been coiled beneath it. And then he sat down on his furry pants again and looked at the thing and rolled out his pink tongue—for he was still hot. Then he got up and he dug the carrion meat out of the small hole back of the trap. He ate it and went down the hill to the edge of a woods where he curled up atop a rock, covered his face with his tail and went to sleep—all but his ears and nose."

But not all of Nature's wild ones are his pals. Here's Clayt on the snapping turtle, a creature he quite obviously could do without. . . . "The snapper's general appearance is not good. It looks like it had crawled from the prehistoric ooze just long enough to harden into permanence. Its shell usually is mossy. Its hide is covered with warts, wrinkles, ridges and, quite often, leeches. Its forelegs are shingled with assorted pieces of armor plate, and its long, fat tail is deeply notched like a dragon's. . . . Squashed down in the mud, this horny nightmare becomes almost invisible. The extended tail and legs are so messed up with the assorted bric-a-brac previously mentioned that it is difficult to make out the basic outline. Even the tiny eyes don't give the creature away for they are covered with a pattern of camouflaging spots like extra pupils. The strongly hooded jaws are painted with vertical grassy stripes. . . . You'd think that Nature had done enough to help this mud monster snare its suckers. Not so. The South's big snapper actually can entice fish into its cavernous mouth simply by opening a mouth that comes fully equipped with a worm. This is a fleshy muscular appendage in the lower jaw which the turtle is able to maneuver. It looks exactly like a whitish grub doing a square dance."

But then we come back to an animal that tickles his taste; arouses his imagination—the flying squirrel. . . . "Of all the woods creatures, the flying squirrel is the most elfin, both in appearance and temperament. We wouldn't be surprised if the dwarfs with the big hats and long beards who formed the first American Bowling Congress down in Sleepy Hollow were flying squirrels. They'd be up to tricks like that. . . . If you knock on the door of dead trees when you walk in the woods, you may see him, too, dozens of this gregarious elf—whizzing by in 57 different directions—and then vanishing. And then if you listen hard enough that night, maybe you'll hear way off the clicking of Rip Van Winkle's ten pins and you can imagine the bowlers with funny fur hats and long beards—and very large, black eyes."

Who likes wasps? Answer: Seagears. To wit. . . . "It is now late April and we just had a bath—with a wasp. We did not know it was there until it was all over, the bath that is. Of course, this

may have been because the wasp became sort of cooked and got a mushy stiletto. Anyway, when discovered it was already slithering across the bottom of the tub toward the drain. This wasp was kind of soapy but we were still able to observe that it had a short peduncle and was, therefore, very likely a social queen."

From this point, one goes on to learn, among a great assortment of wasp lore, that all wasps "have big brains;" that "the mud dauber wasp has a very long peduncle indeed;" that "yellow jackets are those smallish wasps with brown and yellow rings which get in the jam at picnics;" that "male wasps can't sting, but that they look just like female wasps, which is little if any help."

Finally something concerning the annual miracle—spring. . . . "Every spring Mother Nature and Father Time come out of the wings on Earth's revolving stage to give the continuous performance of their magic show a shot in the arm.

"Spring is the time of awakening. Let's hope the field of biology and physiology can become at least as exciting (and certainly as remunerative) as the field of engineering. We need more guys to fool around with bats and hedgehogs and beat-up land for they may play the biggest role of all in world survival."

In between the sandwiching paragraphs, quoted above, there is all sorts of head-filling stuff, such as what light has to do with the magic of spring; a humming bird's heart beats very fast, indeed; why some animals hibernate while others do not; a common shrew will eat the equivalent of its own weight each day, and the amounts of sugar and magnesium in the blood of a hibernating hedgehog may fluctuate greatly.

Because Clayt Seagears has been doing business on this corner so long, writing stuff the like of which we have been quoting from here, a great many people have learned something about that wonderful world inside the outdoors. That's good, for, as Clayt says, "We need more guys to fool around with bats and hedgehogs and beat-up land; for they may play the biggest role of all in world survival."

AL. BROMLEY

(Courtesy N.Y.S. Museum)

NORTHERN THREE-TOED WOODPECKER *(Picoides tridactylus)*

Male 7/8 nat. size Female